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THE IRON TRADE REVIEW

VOL. XXXI. CLEVELAND, O. AUGUST 18, 1898. CHICAGO, ILL. NUMBER 33

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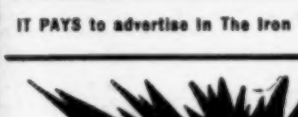

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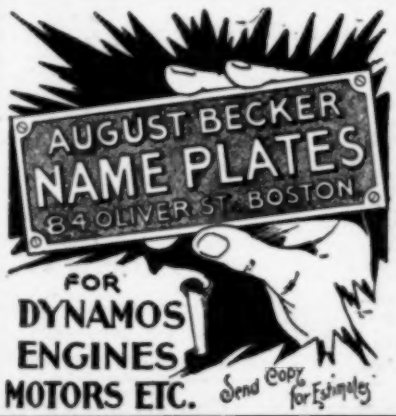

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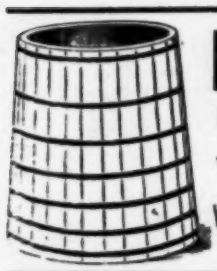

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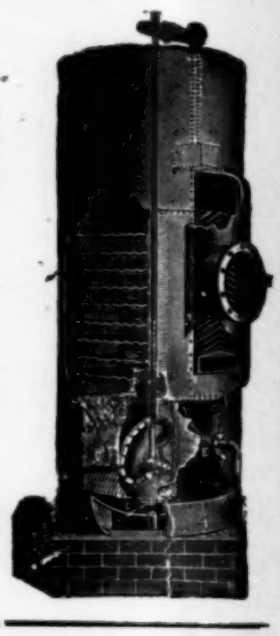

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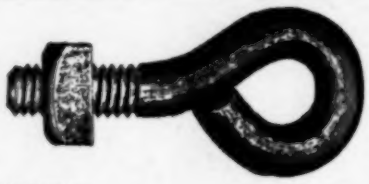

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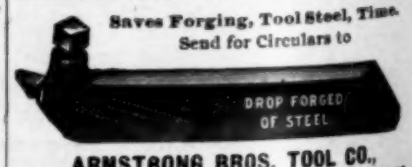

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. AUGUST 18, 1898. CHICAGO, ILL. NUMBER 33

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The upward movement in iron is a palpable fact in some lines, and that an advance is impending in others seems well assured. The situation of the steel works in the Central West that began to develop two or three weeks ago, after the heavy sales to wire mills, is now assuming the aspect of a shortage. Billets and sheet and tin plate bars are advancing out of their position relative to other products, because there is little to be had and some mills are out of the market. The feeling in every department of the trade is strong, and sellers who have not had the courage to take a stand heretofore are now withdrawing some of the low quotations that have held on so long. It would seem that the ending of the war is the long, awaited signal for another buying movement. While the iron industry has not been seriously set back by hostilities, it is well known that with all its enormous production, it yet has lacked the stimulus which was to be expected from investments repeatedly delayed by our foreign entanglements of the past year and a half. The blast furnace statistics for Aug. 1 show that production declined from 216,000 tons a week July 1 to 210,000. Stocks meantime, as indicated by Western Pig Iron Association reports, were stationary at 749,000 tons. This leaves out of account steel works and foundry stocks. The former, so far as Central Western steel plants are concerned, were eaten into in July, consumers taking this course in preference to coming into the market and helping to establish the furnacemen's $10 basis. Bessemer iron has been firmer in the past week and transactions are reported at $9.75, $9.85 and $9.90, valley furnace, the higher prices being realized on latest sales. There is renewed agitation of an advance to $10.50, furnace, the new figure to take effect in September, but there is no expectation now of any further meeting of furnacemen until September. Foundry iron has been active the past week in Chicago and Cincinnati, particularly so in the latter market, where it is estimated 50,000 tons of foundry and mill grades were sold, a large part of it going to pipe works. Inquiries in Middle and Western territory are more numerous, and some sellers have advanced prices. In the East the inside figures available in July have been withdrawn and a considerable amount of business has been done in Philadelphia at 15 to 25 cents advance. The market for steel billets is now fairly $15.75 at makers' mill, Pittsburg, with the tendency upward, in view of the fact that mills generally are sold well to the end of the year and there is little prompt steel to be had anywhere. Sheet and tin plate bars are exceedingly scarce. The movement in billets has strengthened the market for steel bars, and bar iron mills are firmer, after a long run of unprofitable prices. Plates have been advanced $1 a ton by Pittsburg and Chicago sellers. The feeling in all finished lines is increasingly strong, with the trade generally counting on conservative advances.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
808 TRADESMEN'S BUILDING, Aug. 17.

In every branch of the trade improvement may be noted. In many cases prices have responded to the increased demand and in others when no actual advance has been noted, yet the present prices are being rigidly maintained. The advance has been from natural causes and is expected not only to hold, but from the present outlook to be increased.

PIG IRON.—The pool price is now assured. While no sales perhaps are being made on the basis of $10 valley, yet the assurance of sellers is so great that they refuse to quote under that price, offers of $9.95 valley being repeatedly refused here in Pittsburg. The rumor of a further advance of 50 cents in the pool price is again afloat and this time more attention is being paid to it although it cannot be verified. Gray forge is getting in line with the rest of the market by advancing. The present price is from $9.15 to $9.25. A sale of 2,000 tons at $9.20 and another at $9.25 are among recent transactions. Foundry irons show slightly better movement but no actual change in the prices has taken place, from $10 to $10.15 still being the quotation on No. 2. We quote as follows:

Bessemer, valley	$ 9.90 to	$ 10.00
Bessemer, Pittsburg	10.55 to	10.65
No. 1 Foundry	10.40 to	10.50
No. 2 Foundry	10.00 to	10.15
No. 3 Foundry	9.50 to	9.75
Gray Forge, valley furnace	8.85 to	8.95
Gray Forge, Pittsburg	9.15 to	9.25

BILLETS AND RODS.—A further advance in billets has taken place in the last week. The larger local mills are sold up until the end of the year and are not seeking business at all. Their reluctance has aided the advance, the quotation now being $15.75 to $16 makers' mill, Pittsburg, and $15.50 Wheeling and valley district. A sale of something over 1,000 tons at $16.25 delivered Pittsburg, was made recently. Sheet and tin plate bars continue remarkably scarce, the former being impossible to get at almost any price for quick delivery. Quotations are from $17 to $17.25. Rods are in good demand and the price has stiffened owing to their scarcity. Quotations are now $20.75 to $21.

STRUCTURAL MATERIAL.—There has been no further advance in this branch of the trade. Business continues good—new orders are coming in steadily and while nothing of great size has been contracted for, several large contracts are being figured on. Prices are as follows: Beams and channels, 3 to 15 inches, 1.20c; 18 to 24 inches, 1.30c; tees, 1.25c; zees, 1.20c and angles 1.10c. Universal plates alone at 1.15c; with other shapes 1.05c.

IRON AND STEEL SKELP.—The splendid condition of the pipe and tube business keeps skelp in good demand, the call being more for the wider sizes. This product may be expected to advance in view of the continued good demand. The present prices are: Grooved iron skelp, 1.05c to 1.07½c; sheared iron skelp, 1.10c to 1.12½c; grooved steel skelp, 0.95c to 0.97½c; sheared steel skelp, 1.10c to 1.12½c.

PIPES AND TUBES.—Mills are crowded and orders are being turned down almost daily because it is impossible to give delivery in a reasonable time. The tendency of the manufacturers is to stiffen prices wherever possible. Among recent orders are one for 40 miles of 8-inch pipe taken by the Pennsylvania Tube Works Co. for the Standard Oil Co., and another for 32 miles of 10-inch pipe taken by the Oil Well Supply Co., and destined for an Ohio gas field. The additional discounts of 6 tens for less than car lots, and 6 tens and 5 per cent off list for car lots, are being quoted. Base discounts are as follows: Butt weld, black, 57 per cent off;

lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off. Inserted joint casing is quoted at 60 and 5 per cent and screw and socket joint at 65 and 5 per cent.

SHEETS.—The sheet mills are comfortably filled and resting on their oars in regard to new orders, in hopes that the general advance will strike them, as seems likely if present conditions hold. No. 28 is quoted at 1.92½c to 1.95c. The demand for galvanized sheets is steady and the quotation continues 80 and 7½ to 80 and 10 per cent off list with 18 cents freight.

FERRO-MANGANESE.—The demand for ferro-manganese is steady and the price of $50 for 80 per cent delivered, is maintained.

SPIEGEL.—The demand for spiegel is quiet and the quotation of $23.50 to $24 is still the market.

PLATES.—The excellent conditions of last week still prevail. The buying is general; the railroads being by no means the only purchasers, although the western and southern railroads are buying heavily. Prices are firm and an advance is hoped for and expected. The present prices are: Tank, 1.10c; shell, 1.15c; flange, 1.20c; fire-box, 2c and upwards.

RAILS AND TRACK MATERIAL.—The largest local mill is filled to the limit of its output for the rest of the year in regard to rails. At this season of the year railroads buy comparatively few rails, but still the demand is good. The price of rails is firm at $18, Pittsburg. The demand for spikes continues good and they are firm at the present price. Prices are as follows: Iron track bolts, 1.65c to 1.70c; splice bars, 1.10c to 1.15c; links and pins, 1.20c; spikes, 1.40c to 1.45c.

SPELTER.—Spelter has fluctuated this week as usual. The present quotation is $4.55 to $4.60.

OLD MATERIAL.—The demand for old material has increased perceptibly this week. Several sales of old rails are noted, one for 1,000 tons iron rails at $13.75, valley, and two for 1,200 and 2,000 tons respectively, of steel rails at $10 per ton each. Other material we quote as follows: Heavy mixed steel scrap, $10; cast borings, $6 net; railroad cast scrap, $9 gross; wrought scrap, $11.25 net, valley; iron axles, $16, net; steel axles, $12.50, gross; car wheels, $10.25, gross; charcoal scrap, $10, gross; billet and bloom ends, run of mill, $11; busheling scrap, $9, net; machine scrap, $9, gross.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, Aug. 17.

The noticeable feature of the market is the very decided stronger tendency in nearly every line. Mills and furnaces find themselves about full of orders, in nearly every case, and consequently are beginning to come to the conclusion that prices should be higher for future sales. Last week a considerable business was done in all lines, and the outlook for the immediate future is very encouraging. The demand for all classes of iron and steel appears to be getting larger every week, and dealers generally are looking for a very heavy tonnage to be placed within the next six weeks.

PIG IRON.—Sales last week were considerably better than those of the week before. Buyers appear to be coming into the market more freely, and judging from the number of inquiries, in hand at present, the next few weeks will witness very heavy sales. Last week sales were limited to lots of 1,000 tons and less, but there were a good number of these, and the total tonnage closed was better than for several weeks preceding. The shortage in cast scrap has caused an inquiry for No. 4 iron to take its place, and one or two sales of this grade were made last week, including one of 2,000 tons. The furnaces are all very firm in their views, and low priced Southern iron is becoming difficult to secure. Advances in prices are talked of freely and may be had within a short time, if the present demand continues, and gets better, as is fully expected. We have revised our quotations on Southern irons to meet more nearly the present market conditions:

Lake Sup. Charcoal	$11 50 @ $13 00	Southern Coke No. 3	$ 9 75 @ $10 00
Local Coke Fdy. No. 1	11 50 @ 12 00	Southern No. 1 Soft	10 60 @ 10 85
Local Coke Fdy. No. 2	11 00 @ 11 50	Southern No. 2 Soft	10 10 @ 10 30
Local Coke Fdy. No. 3	10 75 @ 11 00	Southern Silveries	11 25 @ 11 50
Local Scotch Fdy. No. 1	11 50 @ 12 00	Jackson Co. Silveries	12 50 @ 14 50
Local Scotch Fdy. No. 2	11 00 @ 11 50	Ohio Strong Softeners	12 00 @ 12 20
Local Scotch Fdy. No. 3	10 75 @ 11 00	Alabama Car Wheel	15 00 @ 16 00
Southern Coke No. 1	10 60 @ 10 85	Malleable Bessemer	11 50 @ 12 05
Southern Coke No. 2	10 10 @ 10 35	Coke Bessemer	11 50 @ 12 00

BARS.—While no very large contracts were closed last week a good tonnage was sold in small lots, and the demand seems to be getting better every week. Some mills have advanced prices over our quotations, but most of them are selling at the figures we quote. Quotations are unchanged at 1.05c to 1.10c for common iron; 1.15c to 1.20c for guaranteed iron; 1.10c to 1.15c for soft steel bars from strictly billet stock.

RAILS AND TRACK SUPPLIES.—Business last week was limited to small lots, but several of these were closed, and the tonnage for the week was fully up to the average. The local mills are securing higher prices on considerable of the tonnage they sell. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—A fair business was done in small lots, but no large sales were made. The demand is heavy, and the mills could secure a much heavier tonnage if they could fill shipping requirements. With the present heavily sold condition, they find it impossible to accept all orders for immediate delivery. Billets are quoted at $16 to $16 50 and rods at $21.50 to $22.

CAR ORDERS.—No large contracts were placed, but several small orders were closed, and further business is in the market. Sales of car material of all kinds were very satisfactory to the mills.

STRUCTURAL MATERIAL.—The contract for the eight-track sectional bridge was finally let last week to the Scherzer Rolling Lift Bridge Co., the contract for the steel going to the Pencoyd Iron Works. This will take about 4,000 tons of material. No other large contracts were placed, but a considerable business was done in small lots. Prices are unchanged but are very firm. Quotations are as follows: Beams, 15-inch and under, 1.35c to 1.40c; 18-inch and over, 1.45c to 1.50c; angles, 1.25c to 1.30c; plates 1.20c to 1.30c; tees, 1.40c to 1.45c; zees, 1.35c to 1.40c. Small lots from stock are quoted at ¼c to ½c higher.

PLATES.—Outside mills did a very large business last week, closing several good sized contracts. The local mills are full of work, and can accept very little business for anything like near-by delivery. Prices are firm and higher, as follows: Tank steel, 1.20c to 1.30c; flange steel, 1.30c to 1.40c; fire box steel, 1.85c to 50.

SHEETS.—A good business was done last week, in both black and galvanized sheets. The demand keeps up well, and sales are expected to be good for the next several weeks. Among the orders closed was one for a considerable tonnage of black sheets for mill shipment. Black sheets are quoted on the basis of 2c to 2.05c for No. 27 and galvanized at 80 and 10 per cent off, with the usual freight allowances.

MERCHANT STEEL.—Season's contracts are plentiful, and buyers are placing orders for heavy requirements. Last week sales were in excess of those of the week previous, and included several large contracts for season's supply. Prices are as follows: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth finished machinery steel, 1.55c to 1.65c; smooth finished tire, 1.45c to 1.55c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—This continues to be the quiet branch of the market. Very few sales are being made, and none of them large. Cast scrap is in good demand, but is in short supply, and consequently sales are not large. Dealers' selling prices are as follows:

Old iron rails, gross	$12 25 @ $12 50	Axles, net	$14 25 @ $14 75
Old steel rails, long, gr.	10 50 @ 11 00	Cast borings, net	4 25 @ 4 50
Old steel rails, short	8 75 @ 9 00	Wrought turnings, net	6 00 @ 6 50
Old wheels, gross	11 00 @ 11 50	Axle turnings, net	7 00 @ 7 25
Railroad forge, net	11 50 @ 12 00	Mixed steel, gross	7 25 @ 7 50
Dealer's forge, net	10 00 @ 10 50	Stove plates, net	5 75 @ 6 00
No. 1 mill, net	7 50 @ 8 00	Heavy melting steel, gr.	8 25 @ 8 50
Heavy cast, net	8 50 @ 9 00	Old iron splice b., net	12 75 @ 13 00
Malleable cast, net	8 00 @ 8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., Aug. 17.

PIG IRON.—The developments in the steel billet market have given increased firmness to Bessemer pig iron, and furnacemen feel that the next turn in the situation will be sales at $10 valley furnace. In the past week the price on outside iron has more closely approximated that of producers. A sale of 5,000 tons was made last week at $9.75 Shenango valley fur-

nace, later $9.85 was realized and then $9.90. Production of Bessemer iron in the two valleys was about 39,000 tons in July, and 40,000 tons in June. For August it is expected to be from 10,000 to 15,000 tons all told. In July unsold stocks at furnace yard decreased about 2,000 tons. Meantime steel works have drawn upon piled iron and by shifting of deliveries and other expedients have apparently co-operated to prevent the establishment of the furnacemen's price. It is now believed that buying at $10 will soon be reported, inquiries for Bessemer having been received in the past few days by furnace firms—an indication that the outside supply is near the end A proposition to fix a date for an advance to $10.50 at furnace has been mooted, but there is no immediate prospect of such action. Foundry irons have been in larger inquiry and more furnaces are adhering to $9.50 in the valley, though lower sales are reported. Forge iron is firmer. A sale of $9 delivered, at valley mill is reported, though within a week this was shaded 10 to 15 cents. We quote f. o. b. Cleveland:

Bessemer,	$10 65	Valley Scotch No. 1	$10 40@10 65
No. 1 Strong Foundry	10 40@10 65	Valley Scotch No. 2	10 25
No. 2 Strong Foundry	10 10@10 40	Gray Forge	9 25@9.50
No. 3 Foundry	9 65	Lake Superior Charcoal	11 50

BILLETS AND RODS.—Further advance in steel quotations is noted, though no local transactions are reported. We quote $16 to $16.25 Cleveland, with local and near-by mills well sold to the end of the year. Rods are higher and are now quoted $21.50, Cleveland.

FINISHED MATERIAL.—An advance of $1 a ton in plates is announced by the leading Pittsburg mill, making the present quotation 1.15c Pittsburg for tank. Cleveland business could be done at 1.15c to 1.17½c, but mills that heretofore have been able to promise early deliveries are now becoming filled. Little new business in structural material is reported, but something has been done at the new figure, which is equal to 1 28½c, Cleveland. The local structural mill, which has only rolled certain classes of shapes in the interval of low prices, is again taking business in beams and channels. Bars are firmer and inquiry indicates that buyers would cover before the advance in steel is pronounced. We quote steel bars at 95c Pittsburg mill, and 1c to 1.02½c Cleveland mill. One inquiry for 1,000 tons of bars is up. Bar iron is stiffer and the lowest valley prices of the past three months are not now quoted. Wire and wire nails are very firm, and an advance is expected to be made in a few days. Wire is now quoted at $1.15 and wire nails at $1.35.

OLD MATERIAL.—The outlook is better than for several months. Dealers are not pressing matters and are unwilling to sell at some of the figures bid. We quote: Old iron rails, $13.50; old steel rails, $10 to $10.25; No. 1 wrought scrap, $11 to $11.25; mill scrap, $8; wrought turnings, $6.50; old car wheels, $11.

CINCINNATI.

Aug. 16.

During the past week the market has been very active. A large tonnage has been booked and inquiries are still coming in. Trade has not been confined to any particular line, but has been general. Perhaps the largest purchasers have been the pipe shops, but at the same time the rolling mills have bought some round lots. Under these circumstances, prices are much firmer and a number of companies have ordered an advance. It is not at all likely that the present spurt is over. The past week's purchases will probably aggregate 50,000 tons. The Southern furnaces have accepted orders to that extent that must necessitate some of them selecting with care what obligations they can assume as to early deliveries. Northern iron has not been in as active request as Southern, though there has been sufficient new demand to suggest advance in price, which may be looked for in the very near future. The employment of the mechanics and laborers the country over, gives evidence of extraordinary internal traffic, which enhances the reasonable expectations of enlarged home consumption and general prosperity. There seem to be no clouds upon the commercial horizon, and all conditions point to a continued improvement of the general situation. We quote for cash f. o. b. Cincinnati: Southern coke No. 1 foundry, $9.75 to $10.00; No. 2, $9.50 to $9.75 No. 3, $9.10 to $9.35; No 4, and gray forge, $8.75 to $9 00; mottled, $8.50 to $8.75; No. 1 soft, $9.75; No. 2, soft, $9.25 to $9.50; Tennessee charcoal, No. 1, $12.50 to $13; Hanging rock charcoal, No. 1, $14.50 to $15.50; Jackson Co., silvery, No. 1, $12 to $12.50; standard Georgia car wheel, $14.25 to $15.

PHILADELPHIA.

Aug. 16.

There is more and more of a tendency on the part of makers of iron and steel to consider the present market a rising one, and in some instances mills are asking higher prices for their products, while others are staying out of the market as much as possible, holding off for the higher values they feel sure will come. The pig iron market is very firm, and while there has been no actual advance in prices they are practically higher, as there are few sellers at the inside quotations. Some furnaces have declined to quote on recent business, being sold up for two or three months ahead. We quote No. 1X foundry at $11.25 to $11.75; No. 2X foundry, $10.50 to $11; No. 2 plain, $10.25 to $10.50; standard mill irons, $10 to $10.25; ordinary mill irons, $9.75 to $10; Bessemer, $12 to $12.50; low phosphorus, $16 25 to $16.50. Billet makers appear to be not at all anxious to push business, and sometimes considerable urging is required to induce them to name prices. The market is very firm and higher, $17 to $17.50 being about the quotation at present. A very marked improvement is seen in finished material, both in sales and prices. Plates and shapes continue active, and more business is being had in bars, sheets, skelp and other forms of steel. Prices are quoted as follows: Beams and channels, 1.25c to 1.55c; angles, 1.25c to 1.30c; refined bar iron, 1.10c to 1.15c; soft steel, bars, 1.15c to 1.20c; tank plates, 1.22½c to 1.27½c.

THE TIN PLATE MARKET.

The fact that there has been a considerably better market for all forms of iron and steel during the past week, and the added fact that tin plate makers must pay higher prices for their steel and for their pig tin, have made no impression on tin plate prices. Very little business has been done for future deliveries, and few mills are willing to take business at the prices that are being offered by one or two important sellers. Just what is meant by the very low offers being made from Indiana district is hard to understand. As mentioned in previous reports, there is a wide range between highest and lowest seller on this market to-day. Especially is this true for deliveries over the second half of the year. When it is considered that two years ago there were about 170 hot rolls in operation, while to-day there are nearly 270, there is little wonder that prices have continued in their downward course.

The canning trade on the Pacific Coast has been very disappointing this year, and large stocks of plates will be carried over to another season. We quote 100-lb. coke tins f. o. b. mill Pittsburg and Indiana districts: $2.70, August and first half of September: $2.65, second half of September and October; $2.60, November and later.

New Steel Cars for Heavy Machinery.

Ten new flat cars, says an exchange, have been completed recently for the New York Central Railroad at the West Albany car shops, which will work a radical change in the old-time methods of transporting heavy machinery. These new cars are of steel with steel trucks and each car has a carrying capacity of 120,000 pounds. Within a few years different railroad companies have been experimenting with steel freight cars and a number of steel cars of various kinds have been constructed and operated with more or less success. The steel flat cars built for the New York Central Railroad have already done good service in carrying some of the heavy guns from the Watervliet Arsenal. One of these new cars has also carried a completed locomotive which weighed about 115,000 pounds. Heretofore a new locomotive of the large type, if transported before it was ready to run on its own wheels, had to be shipped in sections in order to distribute its weight over the train. Under the new order of things a new mammoth engine that requires to be moved as freight, is run upon a track laid on the steel flat car, and being blocked in position is carried safely any distance, as though it were a new landau or a new street car. The new flat cars are 36 feet long and of the usual width, and each car weighs 29,000 pounds. Another advantage of these improved steel cars is their ability to carry large dynamos, and other heavy electrical machinery in completed form. This advantage is appreciated by the manufacturers of such heavy machinery, as it saves both time and expense. Now, after a heavy machine has been set up in the manufacturers' works it is not necessary to take it apart to ship it, and then set it up piecemeal a second time after it reaches its destination. The entire machine can be loaded upon a steel flat car and carried to its destination intact.

THE IRON TRADE REVIEW
AND
INDUSTRIAL WORLD.

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THE LARGER PROSPERITY AHEAD.

As in 1897, August brings better things for the iron trade. Almost immediately after the Dingley tariff took effect, on July 24, 1897, iron market reports began to tell of improvement. Furnaces that had been idle for months started up in response to the larger demand, and there was a betterment in prices that lasted until heavy production began to assert itself in the usual way.

The improvement of August, 1898, comes after months of heavy production, accompanying consumption equally heavy, even preponderating, statistics would indicate. For weeks good authorities in the trade have seen the development of conditions calculated, in their opinion, to bring a moderate advance, if the usual fall demand should be accompanied by the ending of the war. The fall demand is already here; the signed protocol amounts to a restoration of peace. The conditions have been met, and the advance in steel reflected in our Pittsburg advices two weeks ago, and emphasized a week later, gauges what well may be regarded as the most promising movement in the iron trade in years.

Conditions outside the iron industry conspire to give significance to this improvement and to make it more than a mere incident in a year that is to make a new record of production. Not in years has opinion concerning the business outlook throughout the country been so unanimously optimistic. That every factor in the commercial world—manufacturer, farmer, banker, investor, Wall street operator, railroad official—looks for a period of exceptional expansion, meets a prime condition for the bringing on of such a term of prosperity. Looking over the situation, it would seem that scarcely a fragment of uncertainty exists, on which to base an interrogation of the future.

Two years of agricultural prosperity have put Bryanism beyond the chance of working harm. It can never come so near to victory as in 1896. The gold standard is steadly gaining; and while the frequent assertion that the currency question is settled is putting it too strongly, the United States Treasury has been put beyond the chance of embarrassment from gold withdrawal, for a long time, and there will be a remedy for the "endless chain" before it can again become an evil.

Fear of foreign complications has hurt enterprise from the moment the country began to recover from the panic. The end of the Cuban war has removed the Spanish nightmare. The war has cemented a friendship with England that makes Venezuelan and fisheries disturbances impossible of repetition.

Abundance of capital at a low rate of interest is available for enterprises which have been in suspense since the blowing up of the Maine. Not only new enterprises, but minor contracts, and purchases, postponed to await the guaranty of peace, will now come out to swell the tide.

Business was never so free from the fear of political disturbance. The country has been unified by the war. At no time in our history have the acts of an administration been so generally and heartily supported. In the presence of war a revenue measure has been agreed upon that under any other circumstances would have created hopeless division. It will produce abundance of revenue to carry out all the plans of army and naval enlargement that are to be a large factor in the industrial activity of the near future. Its operations will put National finances on an enduring basis of soundness and beget world-wide confidence in the ability of our Government to make good all its pledges.

The phenomenal export trade of the past year, and the new sense of their destiny as manufacturers and provisioners for the world that has come to the American people in the past few months, promise much for outer trade as an element in the coming prosperity. Ways have been opened up for foreign trade, in the past three months, that years of diplomacy could not have vouchsafed. That Cuba and Porto Rico will be occupied not only by our arms but speedily peopled with advance agents of industrial and commercial establishments scarcely needs saying. With her 13,000,000 acres of primeval forests, including valuable commercial woods, her mineral deposits that have been barely scratched as yet, and her possibilities in sugar culture only half-developed, Cuba offers a field that capital from the United States will not be slow to cultivate. And as the Anglo-Saxon element in Cuba's life increases, her wants and her buying power will be greatly expanded. There will be more railroad building in Cuba, as the development of her resources is undertaken in earnest. But all apart from the new fields which the war has opened up are the indications of large returns from the pioneering work done in many foreign fields in the past few years. The war has wonderfully enhanced the repute of American mechanical skill and of American engineering products with all the world, and the returns from this world wide advertising will be pouring in upon our manufacturers for years to come.

The agricultural outlook is for a repetition of the

bountiful crops of 1896 and 1897. The farmer's prosperity has been to a large extent the country's prosperity in these two years. From the high prices he has had for all his products he has paid mortgages on land and on farm machinery and now has a surplus to spend. Government crop reports show clearly that there is a large yield of wheat, a fair crop of corn supplemented by considerable stores of old corn, and a cotton crop fully up to the expectations. The carrying lines are assured of a large year's business; with some of them the next twelve months are expected to prove the best year in their history.

In short, the situation is one in which it would seem that all the fetters upon industry and commerce have been cut. Nothing is left, out of which to make a scare large enough to influence business.

The iron trade more than ever will share in any programme of general prosperity, because iron and steel, since the last run of good times, have taken a larger place than before in the world's needs. We have referred to some elements in the situation outside of the iron industry; internal considerations have been so constantly discussed that there is little to add. Active mills and furnaces are up to a high point of efficiency. The fittest among them will be crowded with business, and between the level of prices to-day—which in a number of lines is above that of a fortnight ago—and the figure which idle plants must have to call them into activity, is a margin which means large profits to a few and a moderate return to the rank and file.

FOREIGN IRON TRADE SINCE 1880.

In our issue of last week, in connection with a statement of the tonnage and value of iron and steel exports and imports, of the fiscal year ending June 30, we presented the values of these exports and imports for the years included between 1893 and 1898, the former being the last year in which the imports were larger than the exports. A more impressive presentation of the great change that has come over this trade is obtained by going back nearly two decades, beginning with the fiscal year 1880, which included the months of largest imports under the boom of 1879:

Fiscal year.	Imports.	Exports.	Excess.
1880	$71,266,699	$14,716,524	Imp. 56,550,175
1881	60,604,477	16,608,767	" 43,995,710
1882	67,976,897	20,748,206	" 47,228,691
1883	58,495,246	22,826,528	" 35,668,718
1884	40,147,053	21,909,881	" 18,237,172
1885	33,610,093	16,592,155	" 17,017 938
1886	37,534,078	15,745,569	" 21,788,509
1887	49,303 164	15,958,502	" 33,344,662
1888	48,992,757	17,763,034	" 31,229,723
1889	42,377,793	21,156,077	" 21,221,716
1890	41,679,501	25,542,208	" 16,137,293
1891	53 544 372	28 909,614	" 24,634,758
1892	28,928,103	28,800,930	" 127,173
1893	34.450,734	30,186,482	" 4,751,492
1894	20,594,373	29,214,393	Exp. 8,394,495
1895	23,048,515	32,000,989	" 8,952,474
1896	25,338,103	41,160,877	" 15,822,774
1897	16,094,537	57,497,872	" 41,400,624
1898	12,615,913	70,367,527	" 57,751,614

The remarkable transformation that we have commented upon before is seen by comparing the first and last lines of the table. The import balance of 1880 is almost indentical with the export balance of 1898. From importing nearly five times as much iron and steel as we exported in 1880, we exported in the fiscal year 1898 more than five and a half times as much as we imported. While prophecy is far from profitable, there can be but one prediction for 1899—a vastly greater export trade and stationary or lessened imports. The prospect is one that the iron trade may well regard with satisfaction, for the foreign trade is not only a safety valve for the home market but, as some of our manufacturers have been finding out, its profits, in particular instances, are better than can be won in the hard-beaten paths of over-cultivated domestic lines.

A DIRECTOR of the Minnesota Iron Co. is authority for the statement that while negotiations are in progress for the consolidation of that company and the Illinois Steel Co., the project thus far is not near conclusion. A committee composed of representatives of each of the two companies was appointed recently to go over the books and make a report at a joint meeting of the boards of directors. This committee was to present its report at a meeting held in New York on Wednesday of this week. What will be done as a result of this report is still to be decided. On the same authority it may be said that at present there is no talk of a third iron and steel concern becoming a party to the deal. It is probable that the Elgin, Joliet & Eastern Co. is the company to which reference has been made as the third factor in pending negotiations. Its relations with the Illinois Steel Co. are already close and the steel company's freight is an important part of its business. We have commented heretofore on some phases of the proposed merging of ore and steel interests. The possibility that the Minnesota Iron Co.'s Mesabi competitor might acquire such an interest in the steel company as to become the latter's dependence for Mesabi ores, is doubtless an element of no little importance in the transaction.

The announcement that Attorney General Monnett, of Ohio, will bring suit against the American Steel & Wire Co., under the Valentine anti-trust law may be taken with a grain of salt. Mr. Monnett has said that if evidence can be furnished him that the HP Nail Co., which formerly owned one of the Cleveland plants of the consolidated company, is identified with a trust, he will bring suit. No such proof will be forthcoming. The HP Nail Co. passed out of existence, when the American Steel & Wire Co. was formed, as did every other company whose plants were acquired. It is safe to assume that it will be discovered in Ohio, as in Indiana, that a consolidation and a trust are two different propositions. Yet it is to be said that consolidations do not find any greater favor with public opinion than corporations filling the technical description of a trust. It is especially unfortunate that this wire consolidation, which it was announced would make a profit on its high capitalization by saving freights on the cross-shipments of the competitive regime, and by ecomomies in office, administrative and selling expenses, should have started its career with a cut in wages. Under all the circumstances, and particularly in view of the efforts to boom stock values, such a course was bound to prove unpopular.

AMERICAN IRON TRADE FOR 19 MONTHS.

We make liberal extracts below from the review of the iron trade of the country in 1897 and the first seven months of 1898, written by General Manager Swank, for the annual report of the American Iron and Steel Association and printed in the current issue of the *Bulletin*:

From July, 1897, when the Dingley tariff became a law, until the present time, the consumption of iron and steel has been remarkably active in all lines. The production of the crude material, pig iron, in the last six months of 1897 was very nearly as large as in any preceding six months in our history, exceeding 5,000,000 tons. The production in the whole year was the largest in our history. Our production of Bessemer steel, open-hearth steel, and wire rods in 1897 was also the largest in our history, and our production of steel rails in that year was much larger than in 1896 and larger than in any preceding year since 1890. These great increases in production in 1897 resulted mainly from the increased activity of the last six months of that year. The production of iron and steel in all lines in 1898 promises to exceed that of 1897. Our production of pig iron in the first six months of 1898, exceeded that of the last six months of 1897 over half a million tons.

The Course of Prices.

It will be remembered that the winter of 1896-7 witnessed a continuance of the depression in iron and steel which had existed almost continuously since the early months of 1893. During that winter and the first half of 1897 the prices of iron and steel, which had been very low all through 1896, steadily declined, until on the first of June, 1897, we recorded the fact that these prices were then lower than had ever been known.

During the same period, from 1896 to 1897, the wages of iron and steel workers were generally reduced an average of 10 per cent. This was the situation when our last annual report appeared. With the increased activity in all leading branches of industry which soon afterwards set in there was no immediate improvement in iron and steel prices. In the latter part of August and in September, however, prices improved and this improvement continued throughout October, but in November and December there was again a marked weakening in prices, and this weakness in prices is only now beginning to disappear.

The course of prices for all iron and steel products from June, 1897, to the present time is fairly indicated by the quotations for steel billets at Pittsburg, which have been as follows: June, $14 per ton; July, $14; August, $14 to $14.90; September, $15 to $16; October, $16.50 to $16.75; November, $16.50, dropping to $15.50; December, $15. January, 1898, $15; February, $15 to $15.25; March, $15.25 to $15.50; April, $15.50, dropping to $15.25; May, $15, dropping to $14.75; June, $14.75; July, $14.75; August, $14.75. All these are fair quotations for most of the sales made in the months mentioned. The lowest price of billets every recorded, $13.85, was in May, 1897. Steel rails have brought only $17 and $18 in the last 12 months.

Since the enactment of the Dingley tariff, wages in the iron trade have remained as a rule as they had been fixed in the first six months of 1897. In some branches of the trade they have been restored to the figures prevailing before the reductions that were then made, but there has been no general advance in wages. As a compensation for lower wages in some branches of the iron trade than have heretofore prevailed, there has been, since the summer of 1897, steady employment for all who wished to work.

Excessive Producing Capacity.

The general causes of continued low prices for all manufactured products, which are of much wider operation than the boundaries of our own country, have been so often explained that it is not necessary to repeat them here. It may again be remarked, however, that a special cause of low prices for iron and steel in our country in late years is to be found in the possession of a capacity of production in all lines that is far in excess of the combined home and foreign demand, large as this demand has been. This special cause of low prices for iron and steel is made clearly apparent in the figures that are presented in our recently issued Directory to the Iron and Steel works of the United States. Foreign competition has had nothing to do with the great reduction that has taken place in our iron and steel prices. These prices have been fixed entirely by home competition, and home competition has been severe and even merciless, because we have not only adopted the most approved methods of production but have also expanded our capacity beyond our present wants and beyond reasonable limits. Hence the many consolidations and combinations that have taken place, or been proposed, in the effort to reduce expenses and assure even small profits; hence, too, many of the financial failures of the last few years. It appears to be inevitable that many of our still active iron and steel works that are neither well situated nor equipped with the best appliances for cheap production, or which can make iron only and not steel, must give up the struggle for existence. Except under the most favorable conditions this is no time to build new iron or steel works. Our steel rail industry suggests a policy of wide application. We have not built any new Bessemer steel rail mills for a number of years, because the fact has been made only too plain that we had enough mills of this character and more than enough. * * *

Foreign Trade in Iron and Steel.

The fiscal year which ended on June 30, 1898, was the most remarkable in our history in the great increase that it recorded in our exports of domestic merchandise, a large part of which increase was due to the foreign demand for American iron and steel, which has been growing rapidly in the last few years. In the year mentioned we exported 235,868 tons of pig iron and 232,552 tons of iron and steel rails. The protective policy which was once so industriously derided by our now discredited free-traders, because they said it hindered our foreign trade, is now triumphantly vindicated. This policy has promoted competition, competition has brought down prices, and low prices have opened foreign markets to our products "Wisdom is justified of her children."

Much is said in the newspapers about the means that are necessary to increase our exports of manufactured products to foreign countries. We repeat what we have heretofore said, that the way to increase these exports is to subsidize mail steamship lines between our principal ports and the principal ports of other countries. Trade would follow the flag, and it would be greatly helped by regular and frequent means of communication. We should also build the Nicaragua Canal for commercial as well as for military reasons. The trade of the Orient would then largely fall into our hands.

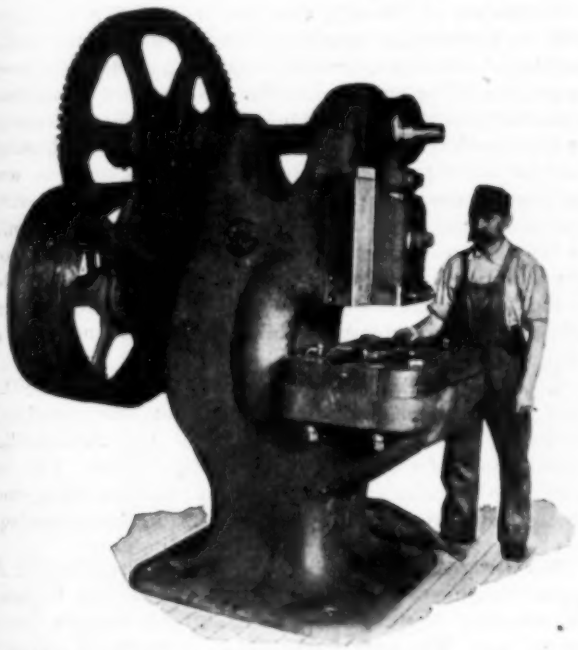
Surprising Electrical Development.

It is figured that in 1884 the total investment in electrical appliances throughout the United States did not aggregate much over $1,000,000, while to-day the capitalization of all the electrical concerns in the country is fully $1,900,000,000. In 1884 a 50-kilo watt dynamo was considered a large machine, and the price of dynamos was about 20 cents per watt of output; at the present time the largest size of generator built is of nearly 5,000 watt capacity, and dynamos in comparatively small sizes, without switch boards, now cost about two cents per watt. It is estimated that about $600,000,000 has been invested in electric lighting stations and plants in the United States. There are to-day in the United States about 14,000 miles of electric railroad, with a nominal capital of about $1,000,000,000 and employing about 170,000 men. People can now actually converse at a distance of 1,800 miles, and conversations at distances of 1,500 miles are common. There are now over 1,000,000 telephones connected with the country's telephone service, employing a capitalization of about $100,000,000 with 40,000 stations, and about 900,000 miles of wire. Every day about 17,000 employes make on an average more than 3,000,000 telephone connections. Truly this is an age of progress that is without parallel in the past. —[Wall Street Journal.

W. S. Rockwell & Co., the New York furnace engineers, have recently installed four of their improved oil annealing furnaces at the Winchester Repeating Arms Co.'s works, New Haven, Conn. They also installed for the same firm their improved duplex system for burning fuel oil. They report sufficient orders on hand to keep them busy the balance of this year.

FORMING PRESS FOR GENERAL WORK.

The Ferracute Machine Co., of Bridgeton, N. J., manufacturers of presses, dies and other sheet-metal machinery, makes a specialty of presses for bicycle, hardware and iron trades. A popular press for general work is press PG6, of which an illustration is given. It is massive and well-designed, exerting a pressure of 84 tons. Its weight is about 12,100 pounds. It is provided with a clutch so that it stops automatically at the top of the stroke, the operator having merely to touch the toe-treadle in order to make stroke, or it can be run continuously by locking the treadle down. The clutch is provided with a safety lock, so that the operator can set the dies without removing the belt. There is also a self-oiling arrangement for the fly-wheel. That it may be used on the various lines of work for which it is designed, it is provided with a long adjustment of the ram, and ample room on the bed, and a greater amount of height from bed to ram than is usually found. The regular stroke is one and one-half inches, but it can be provided with an extra long stroke by having a special eccentric and pitman-strap, so it can be used for bending



and forming work, the maximum stroke being about five inches. It is fitted with forged steel shaft, cut gearing, hardened bolts and nuts and drop-forged wrenches.

The Ferracute Machine Co. also makes a variety of other presses, 300 different kinds in all, and there are several special presses for making cycle fittings, bending handle-bars, and also for coining or embossing badges, name-plates, etc. Special literature is issued for metal manufacturers, describing presses of most service in the manufacture of bicycles and cycle fittings, hardware, bolts, nuts, washers, etc.

Higher speed in new battleships was decided upon on Aug. 9 by the Naval Board of Construction. But the board opposed making new designs for these ships, and recommended that bids be opened on Sept. 1, as originally proposed. This action is taken in the hope that the builders will submit plans and bids for faster ships, and the Cramps and the Newport News ship-yard have already promised to send in such bids. Engineer-in-Chief Melville dissents from the recommendation of the board, and sends in plans of engines for speeds of 17 and 18 knots; but for the latter speed he wants 600 tons additional displacement if the 1,200-ton coal capacity and 6,300-knot steaming radius are to be preserved. The inherent danger in increasing speed without proper increase in displacement will be a crowding of machinery and a continuance of unsufferable heat conditions in the fire and engine rooms. —[Engineering News.

The Totten & Hogg Iron & Steel Foundry Co., Pittsburg, has received an order to equip the new annealing furnaces of the Monongahela Tin Plate Co., Pittsburg, with Freeman's patent furnace chargers.

ASSOCIATION FOR TESTING MATERIALS.

The executive committee of the American Section of the International Association for Testing Materials at a meeting held at the Engineers' Club, Philadelphia, July 30, 1898, selected Saturday, Aug. 27, as the date and the Engineers' Club, 1122 Girard st., Philadelphia, as the place of the first annual meeting of the American Section of the International Association for Testing Materials. At the afternoon session by-laws will be adopted and other business transacted. In the evening there will be discussions on two announced subjects. That on "The Relation of the International Association to Producers and Consumers," will be opened by Dr. Charles B. Dudley, and Mr. Wm. R. Webster. The discussion of the question "In what manner will the adoption of standard specifications improve industrial methods and processes?" will be opened by Prof. Rolla C. Carpenter and Mr. Gus C. Henning.

In connection with the announcement of this meeting, the following minute is given, of the various steps taken in the international movement for the unification of testing methods:

"The International Association for Testing Materials was the result of the efforts of Profs. J. Bauschinger, L. v. Tetmajer, A. Martens, F. Kick and F. Hartig, to devise means for promoting greater uniformity in the methods for testing materials. In 1882 these gentlemen issued a call for a preliminary meeting to be held at Munich, at which time they organized with Prof. John Bauschinger as chairman. Subsequent conferences were held at Dresden, in 1884, Berlin in 1886, Munich in 1888, and Vienna in 1893, at which all European countries except England, France and Turkey, were represented. Conventions were held at Zurich in 1895 and Stockholm in 1897, at which England and France were also represented. At the Zurick convention in 1895 the present permanent International organization was formed.

"The American Society of Mechanical Engineers has been represented at these meetings since the Vienna conference in 1893. The United States Government was first represented at Zurich in 1895 by an army officer, while at Stockholm it was represented by both army and navy and several American engineers. In 1890 the French government appointed a commission to report on the 'Methods of Testing the Materials of Construction.' This commission became identified with the International Association in 1895 at the Zurich convention, and has since taken very active part. Great Britain is strongly interested and promises to take active part hereafter. At present all European countries except Turkey are actively participating in the work of the association.

"The association has at the present time over 1,288 members, who are distributed geographically as follows: Australia, 1; Belgium, 17; Chili, 1; Denmark, 36; Germany, 392; England, 24; France, 54; Holland, 46; Italy, 34; Luxembourg, 6; Norway, 35; Austria-Hungary, 154; Portugal, 5; Roumania, 17; Russia, 217; Sweden, 56; Switzerland, 84; Servia, 1; Spain, 34; Japan 1, and United States 73. Since July, 1896, the transactions of the International Association have appeared in its official organ *Baumaterialenkunde*, in the French and German languages. Hereafter these transactions will also be printed in the journal in English.

"At the last convention it was decided that, in order to simplify the work of the association, the various countries should organize national sections, and the members of Council of the International Association were authorized to effect such organizations.

"In accordance with this decision, Mr. Gus. C. Henning, the American member of the Council of the International Association, issued a circular letter to the American members, requesting them to meet at the Engineers' Club, Philadelphia, on the evening of June 16, 1898, for the purpose of organization."

Then follows the account of the Philadelphia meeting, at which the American Section was organized, as already reported in these columns.

Of the total number of furnaces in the Pittsburg district, 28 are in blast, which includes two spiegel furnaces. The weekly capacity of these furnaces, as estimated for the month of July, is placed at 56,550 tons, as against 59,113 the month previous.

PERSONAL.

S. Groves, the well known Pittsburg mechanical engineer, has returned from a three months' stay in England. Mr. Groves has made arrangements recently for pushing the sale in the United States, of his gear-molding machine.

Frank Baackes, general manager of the American Steel & Wire Co., with office in Cleveland, has resigned. Mr. Baackes was general manager of the Salem Wire Nail Co., whose property was acquired by the consolidated company. The announcement that he will start another wire company is made without authority. It is said, also, that the report that disagreement with his associates over the present strike led to Mr. Baackes's resignation is untrue.

Henry G. Morse has resigned as president of the Harlan & Hollingsworth Co., Wilmington, Del. He has held the office for two years, having been president of the Edge Moor Iron Co. for nine years preceding.

H. C. Frick returned from abroad last week, arriving in New York Aug. 9 on the Kaiser Wilhelm der Grosse. Mr. Frick purchased some time ago a painting by P. A. J. Dagnan Bouveret, the celebrated French artist, entitled, "Christ and the Disciples at Emmaus," and has presented it to the Carnegie Institute.

Stanislas de Labounsky and Ignaz Jablonski, respectively chiefs of the car and bridge departments of the great Pontilov works, St. Petersburg, Russia, were visitors in Pittsburg last week. They have spent some time in the industrial establishments of New York, Philadelphia, Altoona, and Pittsburg, and are now in Chicago. They are looking up improved machinery for turning out all classes of railway equipment.

Louis Affelder, of Pittsburg, goes to Siberia to open a branch office of the Pittsburg Bridge Co.

Mr. Carnegie is expected to return to this country in October. His health is fully restored.

At the annual meeting of the directors of the Buhl Steel Co., of Sharon, Pa., held last week, Myron Arms, of Niles, O., was elected president in place of C. H. Buhl, who declined re-election.

John F. Mokate, superintendent of the Soho Furnace, Pittsburg, has been made superintendent of the Eliza Furnace, succeeding R. P. Douglass, who resigned.

Mr. John Sandford, of the Eskbank Iron Works, Lithgow, New South Wales, spent several days of last and this week in Pittsburg visiting the various steel mills of the locality. He left for the east Monday night.

Lake Superior Iron Mines.

The Oliver Iron Mining Co. has not yet secured all of the stock of the Pioneer Mining Co., which would give it possession of the largest mine at Ely. Notwithstanding the fact that it has been given out that the deal was certain to go through, there is some likelihood of its ultimate failure. The Minnesota Iron Co., it is said, has been at work trying to buy up some of this stock and the failure of the Oliver company to get certain blocks of it that it had thought could be had at any time is attributed to a suddenly discovered desire, on the part of the Minnesota, to own the mine. With the Pioneer the new combination would be assured of an ore supply for many years. Without it, it would be necessary to buy ore of its strongest competitor or develop new mines on the Vermilion range.—[Duluth Herald.

Railroads in the Minnesota iron ore rate case have produced a larger volume of testimony than the complainants in the hearing at Duluth. The commissioners, while making no statement, intimate that the railroads have developed a strong case. When the hearing is resumed during the first week in September, the roads will attempt to show that within a few years iron ore beds will be worked out. In a recent interview Attorney General Childs said: "During the hearing the petitioners have attempted to show that the earnings of the roads are out of proportion to the capital and witnesses have been introduced on both sides to show the cost of the roads. The testimony on this point has varied largely. The petitioners claim that the Iron Range road, for instance, can be duplicated for $6,600,000, while the witnesses for the road testify that it could not be built for less than $15,000,000. Should they be successful in securing the reduction asked for, the result will be very serious for the respondents. I do not think that so far there has been much of a preponderance of evidence on either side, but on some points the roads have had a larger number of witnesses."

RECEIVED FROM THE TRADE.

The latest catalogue of the Lunkenheimer Co., Cincinnati, is about as complete a list of valves, oil cups, gauges, injectors, lubricators, and other steam specialties, as can well be imagined. The book is of 208 pages, and is well printed and illustrated. It contains descriptions of many new devices of the company, together with all the old and successful specialties previously introduced. It will be of considerable value to engineers as a general reference book of steam specialties. Copies will be mailed to applicants by the company.

A joint catalogue has been issued by the Smith & Hemenway Co., manufacturers and importers of cutlery and hardware specialties; the Utica Drop Forge & Tool Co., maker of nippers and pliers, the Swedish Razor Co., maker of razors, and the Ericsson Telephone Co., manufacturers and importers of telephones. All of these companies have sales offices at 20 Warren st., New York, from where the catalogue is issued. The idea in making the combination catalogue was to furnish buyers with a "ready reference" book of the various lines contained in it.

Under date of January, 1898, the Jeffrey Mfg. Co., Columbus, O., has issued a special catalogue of elevator buckets, and spiral conveyors, devoting a few pages only to the other specialties of the company. The information contained in this catalogue is largely anabridgement of the same material in the complete catalogue. The company is well known as a maker of thoroughly reliable goods, and claims to manufacture the most complete line of chain belting, elevating, conveying and power-transmitting machinery of any concern of the kind in the world. With this latest catalogue comes the announcement of the completion of the company's sheet-metal department, which is specially equipped for the manufacture of Jeffrey standard elevator buckets and spiral conveyors.

The American Fire Brick & Clay Co., Mineral Point, O., issues a catalogue of its fire brick and fire clay for metallurgical purposes. Colored plates are given of the various shapes manufactured for kiln, furnace and cupola use. The company also manufactures circle and key brick for lining smoke stacks and carries in stock brick and tile for boiler settings.

THE Riter-Conley Co., Pittsburg, will construct for the Allegheny Heating Co one of the largest natural gas holders in the country. It will cost $225,000, and will contain 5,000,000 coubic feet. The tank proper will be 44 feet high, and including the holder, 221 feet. The diameter will be 198 feet, and the weight of the tank 3,000 tons.

THE Oliver-Snyder Co, of Pittsburg, has purchased from the Edward P. Allis Co. a steel type blowing engine and two 42x16 inch independent Reynolds air pumps and condensers for its Rosena furnace, at New Castle, Pa.

THE H. K. Porter Co., of Pittsburg, is installing compressed air plants for the Pennsylvania Coal Co., at Pittston, Pa.; and the Ashland Coal & Iron Co., Ashland, Ky.

THE annual report of the United States Geological Survey on the production of coke in the United States, compiled by E. W. Parker, has been completed. It shows that the coke produced in the United States in 1897 aggregated 13,288,984 net tons, against 11,788,773 net tons in 1896. The output in 1897 was 1,500,211 tons more than that in 1896, but was still about 45,000 tons less than in 1895.

IT is stated that representatives of the Spanish-American Iron Co., and the Juragua Iron Co., who went to Washington to protest against the new export duty on iron ore from Santiago de Cuba, were promised the careful consideration of their claims. It was represented that the new duty of 15 cents imposed by the Government at Santiago, in addition to the Spanish duty of five cents, would prevent the working of the mines. Secretary Gage was instructed to modify the charge so that it would not be prohibitive. It is expected that the five-cent duty will be restored.

THE Schoen Pressed Steel Co. has awarded a contract to the Riter-Conley Co., for a one-story iron building 708x120 feet on Preble ave., Allegheny.

LESSONS FROM FOUNDRY LOSSES.

In the current issue of the *Iron Molders' Journal* Robert Watson comments on the use to be made of foundry misfortunes. Losses will come even to the skillful and experienced mechanic, and the element of uncertainty will always exist to an extent, he argues. "Experience has taught me," says the writer, "that losses are more deeply impressed upon the average molder's mind than any other shop experience. If he profits by them, and by careful study of causes seeks to avoid a future catastrophe of the same sort, his losses will not be without their compensating advantages; but if he carelessly dismisses it from his mind and trusts to luck to make a good casting next time, he is not a man to be trusted with any important piece of work. And I am extremely sorry to say that there are many such who call themselves molders." The present system of apprenticeship, the writer adds, does not help matters, since three-fourths of the rising generation of molders are not properly trained, being turned adrift as journeymen to learn from their bad work, their employers meantime suffering loss from their mistakes. A practical suggestion is then made, that should commend itself to proprietors, superintendents, and foremen, namely, that molders be encouraged to jot down particulars of their losses and the causes, so far as these can be ascertained, so that the next attempt in the same line may be more successful. As an example of Mr. Watson's own practice in this regard the article gives particulars of two losses he had 30 years before, the details being reproduced from an old note-book:

"The first to which I would call atten'i n was a low pressure, double-jacket cylinder weighing about 14 tons. Three of these were lost in succession and from a different cause each time. The first one was cast short. Some will say, 'That's nothing; that happens every day.' I took a different view of it, and I determined to acquire a knowledge of the rules of measurement, that I might be enabled to figure out the weight of anything to be cast under my care.

"The second cylinder, so my note-book says, poured beautifully and the iron flowed tranquilly into the risers. At this critical moment we all felt a sense of relief, a smile of satisfaction was beginning to form, but it was suddenly changed to one of anxiety as a slight bubbling was noticed in one of the risers. It increased, and before we had time to add a little metal, every outlet was in a state of violent eruption. The spectacle was grand enough, but it was a sad one. After the storm had subsided, every one began speculating as to the cause, and although the class of mechanics was A1 in this shop, nearly every one had a different theory. It finally developed that the blowing came from the inside jacket core into which the metal had obtained an entrance caused by a chaplet (B, Fig. 1), as shown on the sketch, being too tight. It was agreed to do away with chaplets altogether, thus giving the round core a firmer bearing and affording better protection to the vents. The lesson conveyed by this experience is obvious and has been profitable to me in many ways since.

"The third cylinder was lost fr m a cause of quite a different character than either of the others. The pouring was a complete success, and no doubt was entertained that a perfect casting would be turned out; but the laborers stripped the bricks from the steam chest too soon, and it cracked, conveying to me its own lesson on shrinkage and inducing me to study with greater interest and care the probable effects of unequal thicknesses in a casting. In the ordinary small side-floor work we sometimes can afford to make one and find out its peculiarities, but in castings that take days or weeks to make, the molder must study out the various aspects before the metal is introduced. The larger the casting the more danger there is of trouble from this cause. The seeming strength of a casting will not keep it from cracking if the cooling is unequal. A good example of this is shown in the heavy wheel or disc shown in Fig 2, which is also culled from my note-book. The dimensions shown on the side elevation will convey a good idea of the strength of such a casting. Its weight was a little over five tons. This casting was removed from the sand when it was still very hot, but no danger of cracking was anticipated because of its heavy proportions. It was placed on its edge, by a door, after removal from the sand. A light summer breeze was blowing at the time, and in three-quarters of an hour the crack indicated at A, Fig. 2, had developed to the astonishment of every one. But on reflection the cause was apparent—the light breeze was sufficient to bring about inequalities of cooling and a tearing asunder resulted.

"Before closing this article it might prove interesting to some to describe the making of the jacket core shown in Fig. 1. This class of cylinder is very rarely made now and the core is, consequently, a very uncommon one. So that while my description may be ancient history, still it may contain a suggestion that can be profitably employed on some other job. The core was six feet two inches high, three inches thick and 60 inches inside diameter, with an opening, as shown in the cut, to accommodate the steam chest, port cores, etc.

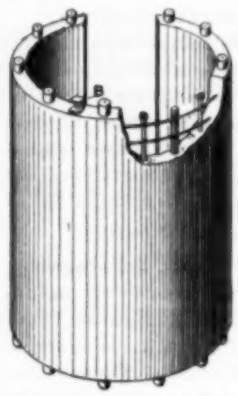


FIG. 1.—CORE JACKET.

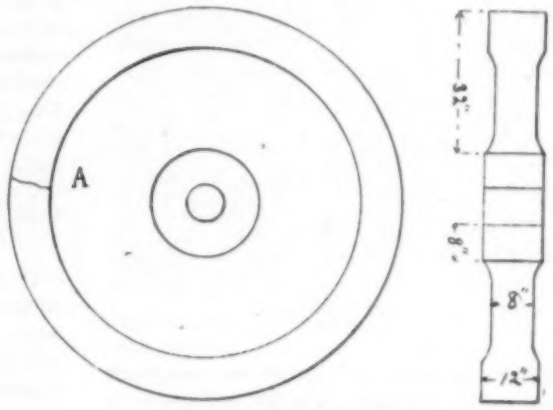


FIG. 2.—DISC, SHOWING CRACK.

The first thing to be done is to build a temporary loam mold, the required height and diameter, with a three-inch base on which to build the core. Owing to the break in this ring core, it was necessary to construct a frame or arbor to carry it. An idea of this arbor will be gathered from what is shown in the break in the sketch. It consisted of a series of upright half-inch rods and tubes alternately, 9 inches apart. The rods were provided with an eye at the top for lifting purposes and with a hook at the bottom for the purpose of carrying the first of the three-eighth inch horizontal rods, which were placed 12 inches apart, and tied to the uprights with wire. The tubes were perforated and wound with straw bands, thus providing means for taking off the vent of the core. We then had a core box made from which to make bricks three inches high, four inches long and two inches thick, provided with a groove, into which a straw band could be laid between each course of bricks, thus providing a channel to the tubes. This allows for one-half inch of loam laid against the temporary mold, and one-half inch for soft loam on the outside, which is finished by the sweep to its proper thickness. These bricks were then laid in the ordinary way, using soft loam so as not to have a wide joint. After being dried and removed from the oven, the temporary mold was removed and the core dressed and finished. The two-inch round cores shown are pasted on the top and bottom the required thickness, the vent being taken off through the top ones."

THE H. K. Porter Co., of Pittsburg, is building a number of small narrow-gauge engines for the Arizona Copper Co., and a few for a mining company in Mexico. The engines for the Arizona company will be of a peculiar design intended for small clearance. The Porter works are quite busy.

IRON AND STEEL MAKING AT MARQUETTE.—II.

BY JOHN BIRKINBINE.

General Comparison of Localities.

In comparing various locations upon the great lakes, the following assumptions are made:

1st. A furnace plant at Marquette, will be located so as to receive ore by railroad cars directly from the mines; with dock facilities for the necessary handling and stocking of coal, or coke, and flux.

2nd. A furnace plant at one of the lower lake ports will be located so as to receive coal, or coke, directly from the mines or ovens, and flux from the quarries by railroad, and with dock facilities for receiving, handling and stocking iron ore.

3d. The above plants will be of practically similar capacity, each well built, equipped with modern machinery and appliances, and operated under skilled, intelligent management.

Each plant will have both railroad and water transportation for its product. To institute such comparisions, it will be unnecessary to make detailed estimates of the cost of producing pig iron, which are mainly of temporary value, for it may be assumed that interest, depreciation, repairs, superintendence, labor, and the quantities of materials charged into the furnace will, in each case, be practically the same. The comparison, as far as producing pig iron is concerned, may be confined to the expense of assembling and caring for the raw materials entering into the manufacture of a ton of this metal. An examination of the prevailing lake tariffs for a series of years, shows that it is equitable to assume that under average conditions the freight upon Lake Superior iron ores, to lower lake receiving docks, is usually twice, and sometimes three times as much, as that upon coal shipped westward contemporaneously between the same points where shipping and receiving facilities are provided. A furnace using the higher grade ores from the Marquette range will require about 1.65 long tons, or, if employing a mixture of the lower grade ores, 1.75 to two gross tons of ore, per ton of pig iron produced. To smelt these ores in large furnaces, under favorable conditions, will, with allowance for contingencies, consume, for the richer, about 0.9 long tons and for the leaner mixture, about one gross ton of coke.

Coke.

The yield of coke from satisfactory bituminous coal, such as would be approved for blast furnace practice, is from 65 to 75 per cent of the weight of the coal; depending upon the method of coking followed, therefore from 1.2 to 1.45 tons of coal would be required to produce the coke for each ton of pig iron made. Ores are usually rated by the gross ton, and coke by the net ton, but for present purposes, comparisons are all made in gross tons.

The furnaces upon the lower lakes obtain coke by railroad, delivered in the stock sheds, and it may be practicable to ship coke by boat to Marquette, but in delivering this from railroad cars to boat, and discharging it from boat to the furnace stockpile at Marquette, by methods now in use, there would be considerable loss by breakage, damage by bilge water, etc., which would not so seriously injure the coal. The coke being of light weight and bulky, would demand higher transportation rates than coal, and it is probable that the charges for loading, transportation and unloading 1.5 tons of coal would not exceed that for one ton of coke. But there is good reason to believe that the skill and ingenuity which is responsible for the present excellent ore and coal handling appliances, will develop satisfactory methods for handling coke when these are demanded.

The relative advantage of shipping coke to Marquette, or of shipping of coal, and coking it there, will, therefore, depend upon the relative freights for these, the charges for interest, maintenance and operations of the ovens, the value of the by-products, and of the uncondensable gases recovered. The possibility of utilizing the by-products, and the waste heat from coke ovens, favors the production at Marquette of the coke required for the blast furnaces located there, for assuming that there would be no special advantage at Marquette for the dispostition and utilization of the ammonia and tar products which are collectible from improved ovens, the surplus, uncondensed gas, may be of value in manufacturing industries. Omitting from consideration any probable value to be derived from the sale of the by-products, beyond equalizing the fixed charges upon the more expensive coking plant, necessary to collect them, the uncondensed gases may be estimated, approximately, as equivalent in heating power to one ton of coal for each ten tons of coke produced. These gases are now used in connection with steel works, and at some coke works the gas is sold, either for heating purposes, or for use as an illuminant after enrichment.

The possibilities of obtaining value from the use of by-product ovens, apply equally to other localities which may be considered as competitors with Marquette, if these improvements are also introduced elsewhere, and their application is mentioned to emphasize the probable advantage of shipping coal to Marquette to be converted into coke at the blast furnace site. To coke at Marquette will demand the erection of a coking plant, especially for supplying the blast furnaces, and its operation will be practically dependent upon the continuous working of the smelting plant. Any coking ovens erected should be of the most approved design, and such as to secure the maximum yield of coke from the coal, for it would seem folly to pay freight on coal to unnecessarily waste a portion of it. The coal carried in stock, over the winter, will represent an interest charge on the money invested, but in comparing Marquette with the lower lake cities this will be more than offset by similar charges on stocks of ore held for use. The stocks of ore and coal must be carried by the mines, shippers, or users, at an interest charge which is ultimately paid by the consumer. Abundant coking coal of excellent quality can be obtained and delivered at the lower lake ports, and satisfactory coke is now supplied to furnaces located at or near these ports.

The coke most approved comes from the Connellsville and the Punxsutawney districts of Pennsylvania, and from the New River section of West Virginia. But improvements in washing and crushing coal, advances in ovens for coking, and a critical study of the structure and composition of bituminous coal may result in obtaining satisfactory coke from coal not now considered as adapted for that purpose.

Other Fuels.

In discussing the fuel supply, the absence of any reference to anthracite coal, raw bituminous coal, natural gas or petroleum, may be noted. These sources of fuel have, however, not been overlooked. Anthracite is more costly, must be transported for greater distances to reach Marquette, and its combustion is less intense than coke in the blast furnace, and bituminous coal is not only cheaper, but more desirable, than anthracite for raising steam and for most metallurgical purposes. It must be admitted that localities favored with a supply of natural gas may have a temporary advantage over Marquette in this fuel for manufacturing purposes, but the uncertainty of duration of the volume of gas, the expense of driving wells, and distribution, bring the cost of natural gas close to that of obtaining gas from producers by distilling coal in locations close to the gas wells. The control of the petroleum product places limitation upon its employment and its cost. Outside of the producing territory it is generally on the basis of three barrels of petroleum equalizing the price of a ton of coal. It is equitable therefore to consider that Marquette will have neither advantage or disadvantage, in the use of oil, over other localities, practically different from the relative commercial value of coal at the various points.

Dolomitic limestone, found in the Northern Peninsula, and excellent limestone obtained from the Southern Peninsula, in Michigan, or from the islands in Lake Erie, offer satisfactory opportunities for securing ample flux. Assuming the Lake Erie islands as the source of supplies, and taking the same rate for transport for limestone, as for coal, the estimate would surely be upon the side of safety.

Minor Economies.

There are numerous economies which may be introduced in connection with blast furnace operation, and in late years efforts have been made to utilize what had previously been waste. Thus the cinder produced by the blast furnace has been converted into a number of special forms, such as blocks for building, road metalling, paving, mineral-wool, cement, etc. Mr. Robert A. Cook states that 2,000 pounds of granulated slag, of proper composition, will make about five and

one-third barrels of cement material. The number of barrels of cement made from this slag depending upon its composition, and how much material is added to it. The value of cinder, per ton, for this purpose, varies, but an average of 25 cents, net, per ton of dry slag, may be assumed. The blast furnace gases are also now being utilized and surplus heat employed; offering additional future possibilities for furnace economies.

Comparison of Buffalo and Cleveland with Marquette.

The following comparisons are based upon manufacturing pig iron at Marquette, Buffalo, or at Cleveland, using the same ores and fuel but allowing an additional charge for coking, and for loss of coal in transportation, and in stocking, of ten cents per gross ton of coal against Marquette. The freight charges only enter in these estimates, for, as before intimated, the costs of ore and coal at the mines, or flux at the quarries, labor, management, interest, etc , are assumed to be the same for each location.

(Similar comparisons, based upon producing pig iron at Chicago, and at Pittsburg, from the same ores and fuels as at Marquette, will also be presented.)

The average freight charges, by water, for a blast furnace plant located at Buffalo, or Cleveland, using the richer ore from the Marquette range, may be stated as follows:

FROM MARQUETTE TO CLEVELAND OR BUFFALO.

1.65 gross tons of iron ore at 50 cents,	$.825
When using the leaner ores, say 1.9 tons at 50 cents,	.95

The freight charges, by water, for a furnace located at Marquette, using the richer ore from the Marquette range, are similarly:

1.2 gross tons of coal, 0.17 tons of limestone, } 1.37 tons at 25 cents,	34 cents.
Cost of unloading and stocking 1.37 tons at 15 cents,	21 "
Allow for loss and extra cost of coking 1.2 tons of coal as above, 10 cents,	12 "
Total,	67 cents.

The freight charges, by water, for a furnace located at Marquette, using the leaner ore from the Marquette range, are:

1.45 tons of coal, 0.35 tons of limestone, } 1.8 tons at 25 cents,	45 cents.
Cost of unloading 1.8 tons at 15 cents,	27 "
Allow for loss and extra cost of coking as above, 10 cents,	14 "
Total,	86 cents.

(The practice in lake transportation is for the vessel to include in its freight the discharge of the ore, but not of the coal and stone, hence the above allowance.)

These comparative estimates are based upon the assumption that in each case the blast furnaces are so located as to require no extra transportation for the materials brought by boat after they are placed upon the furnace dock, that is, that the furnaces on the lower lakes would have their iron ore docks, and those at Marquette have their coal and limestone docks provided with the necessary modern handling equipment.

But a furnace plant, located at Marquette, is entitled to an allowance equivalent to the charge for the maintenance and use of the ore shipping docks, which are owned by the railroad companies.

Interest, depreciation, and the cost of operation of these docks, must now be paid for during a restricted shipping season, but a blast furnace plant, at Marquette, would demand ore and give employment to otherwise idle railroad equipment throughout the year. It is equitable, therefore, to assume that the railroad company could equate their freight rate, so as to give the local plant the advantage of about 8 cents per gross ton of iron ore delivered at a furnace site no more difficult of access than the shipping docks.

(The equity of such allowance was recogized, when, in 1887, the management of the Duluth & Iron Range Railroad offered to contract to deliver ore for a local furnace at the terminus of the road in Duluth for the same freight rate charges as prevailed for ore delivered in vessel hold at the company's docks at Two Harbors, 26 miles nearer than Duluth to the mines then opened.)

Deducting this allowance from the amounts as above given, we have the following comparisons:

For a furnace plant using the richer Marquette ores, located at Cleveland or Buffalo, freight rates on ore as stated,		82.5 cents.
For a plant located at Marquette, freight rate on coal and flux,	67 cents.	
Less dock charges on 1.65 tons of ore at 8 cents,	13.2 "	53.8 "
Leaving a difference in favor of Marquette,		28.7 cents.
Similarly for the leaner ores, a furnace located at Cleveland would pay frieght rates of,		95 cents.
But the plant located at Marquette would have freight rates amounting to	86 cents.	
Less dock charges on 1.9 tons of ore at 8 cents,	15 "	71 "
Leaving a difference in favor of Marquette of		24 cents.

These balances are amply sufficient to account for any possible increase in local freight charges, or difference in labor rates; if such exist, and apparently demonstrates the equity of the statement that pig iron can be produced at Marquette from local ores cheaper than the same ores can be smelted with a similar fuel and flux, at the lower lake ports.

Taking a more optimistic view of Marquette's advantages, the difference in its favor could be made greater, but it has been thought best, for present consideration, to err on the side of safety. Thus the allowance of 10 cents per gross ton of coal, made to cover loss, deterioration, and extra cost of coking, is in deference to a generally accepted conclusion, rather than upon absolute data, for you have had in previous reports the probabilities of such loss combatted.

But the figures above indicate that Marquette has an apparent advantage of about 25 cents per ton over Buffalo or Cleveland in the production of pig iron, an amount which at the present time is worth struggling for. If Lake Superior was open for navigation throughout the year, and if pig iron was sold in cargo lots, it might be found that the metal could be produced at Marquette, and marketed in competition with furnaces at the points named. But the metal must be considered as fowarded by rail tariffs throughout the year, or during the water shipping season, principally in lots less than full cargoes, at increased rates, and therefore, the market for the product of a blast furnace plant would be confined to territory to which it is naturally tributary; influence by the interference of established lines of traffic and advantages given to established terminals.

Comparison of Chicago and Pittsburg with Marquette.

The pig iron industry of the lower lakes is now important, and it will, undoubtedly, increase, but at the present time Pittsburg and Chicago are the largest centers of pig iron production and iron and steel manufacture. It is, therefore, essential that these should also be compared with Marquette, and for this purpose the following is offered:

Estimated freight on raw materials at Chicago, per ton of pig iron made:

1.65 tons of high grade ore by water at 45 cents,	$ .74
0.9 ton of coke, at say $2.50 per ton ($2.25 per net ton) by railroad,	2.25
0.17 ton of limestone, at say 22 cents per ton by railroad,	.04
	$3.03

Estimated freight on raw material at Pittsburg, per ton of pig iron made:

1.65 tons of high grade ore at Cleveland, freight by water, say 50 cents,	$ .82
1.65 tons of ore, freight from Cleveland to Pittsburg, by railroad, at say 95 cents,	1.57
0.9 ton of coke, by railroad, at say 40 cents,	.36
0.17 tons of limestone, by railroad, at say 22 cents,	.04
	$2.79
Less a credit of say 4 cents per ton, for a portion of the ore which is shipped direct, without being docked at Cleveland,	.07
	$2.72

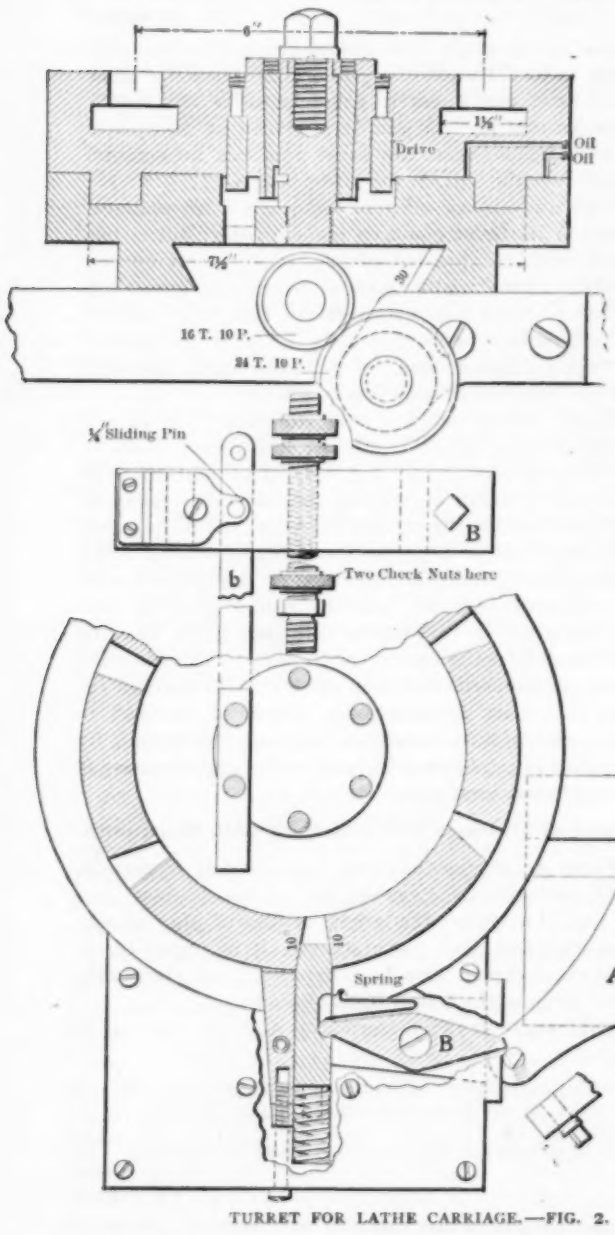
To equate the above with the figures given for Marquette, there should be added the costs of the railroad freights on coal to a lower lake port, or else the freight on coke from ovens to the lower lake ports by rail, the water freight thence

to Marquette being assumed as equivalent to that on the quantity of coal required to produce the coke. Taking the former we have the following, when the higher grade ores are used:

Freight on 1.2 tons of coal from mines to Cleveland, at $1.10,	$1.32
Add estimate previously given, 67 cents, less dock allowance,	.54
Total,	$1.86

Use of Lean Ores.

Similar comparisons can be made as to iron production at Chicago, Pittsburg, Buffalo, or Cleveland, upon the use of the leaner Marquette range ore, but it is questionable whether these will be employed, except to a limited extent as mixtures, elsewhere than near the mines, and they may, therefore, be considered as specially available for use at Marquette.

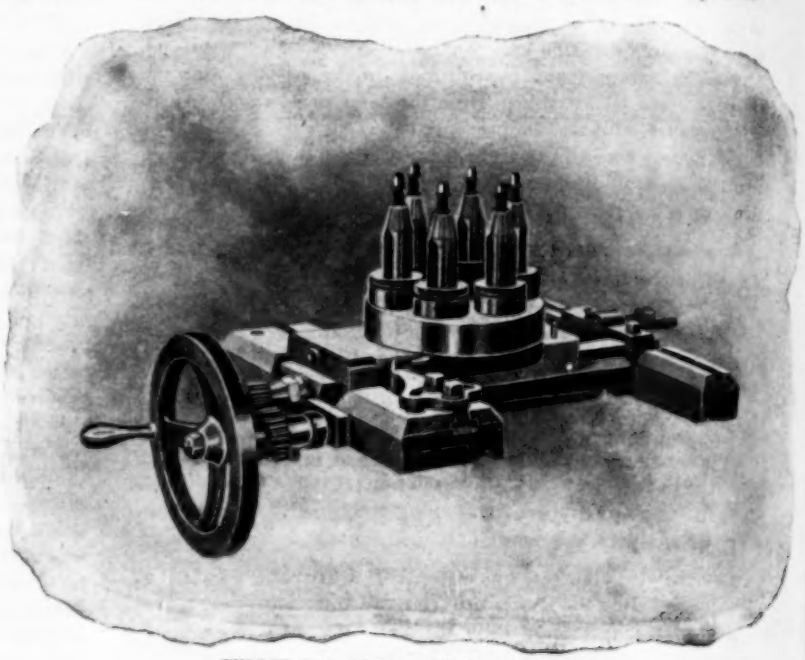


TURRET FOR LATHE CARRIAGE.—FIG. 2.

The variety of ores obtainable from the Marquette range offers opportunity for employing them to provide metal suitable for the different grades and qualities of steel or iron in demand. Although the region has a well recognized reputation for supplying ores low in phosphorus and within the limits accepted as Bessemer, there are large amounts of ore obtained and obtainable, which contain phosphorus in excess of this. As a rule, also, the ores shipped from the Marquette range are of high percentages of iron, but there are deposits entitled to be considered as enormous, the mineral of which is too lean in metallic contents to permit of the transportation charges necessary to convey them to the points of consumption; although a limited quantity of these ores, low in both iron and phosphorus contents, are sent forward to be used as mixtures.

These leaner ores, which, owing to their existence in large masses, readily exploited, or to the fact that large quantities are obtainable cheaply, and are practically waste products, necessarily obtained in mining richer ores, suggests the possibility of utilizing them advantageously at Marquette. A number of these ores are close, in iron contents, to the shipping limit, and considerably richer than many which are mined elsewhere. The freight charges on the additional fuel and flux required to smelt these ores will not equal the transportation cost of delivering the extra amount of ore if the lean material is forwarded to points which would compete with Marquette in producing iron or steel.

The cost of handling a 50 per cent iron ore by railroad trains, or vessels, and at shipping and receiving docks, is as great as for a 65 per cent ore, and therefore, the distances to which the leaner material can be carried advantageously is limited. If used at Marquette such material would only have to withstand the initial charge of rail carriage from the mines to the furnace plant where it would meet the coke and flux necessary for smelting it. The relatively lean ores, however, are of superior grade to those upon which the important iron industry of the Southern States have been developed, and a liberal supply of such minerals, obtainable at a low cost, offers encouragement, to expect that by their use additional competitive advantages will be given to Marquette.



TURRET FOR LATHE CARRIAGE.—FIG. 1.

A WEST BAY CITY, MICH., dispatch says, "W. W. Huntington, representing the Bessemer Steamship Co., is authority for the following statement: 'There will be more boats built this winter at Wheeler's shipyard than ever before, as our company has a year's lease of the plant. We have got to build several more boats this winter, and if we build them at the Superior yards, we will have to enlarge the plant and add new machinery, which we will not have to do by using the Wheeler yard, which is the best equipped on the great lakes.' The yard running full will give employment to 3,500 men daily, and the pay-roll will amount to about $50,000 a week." Manager Bowers, of the Bessemer Steamship Co., Cleveland, said concerning the above, that the Bessemer Steamship Co. never makes its plans known beforehand and that the story was not given out by any one connected with the company.

Two mammoth locomotives, which will weigh over 215,000 lbs. and in size and traction capacity outdo anything now in operation, are being built for the Union Railway Co. (Carnegie) of Pittsburg, by the Pittsburg Locomotive Works. It is expected that they will haul over 7,700 tons each.

TURRET FOR LATHE CARRIAGE.

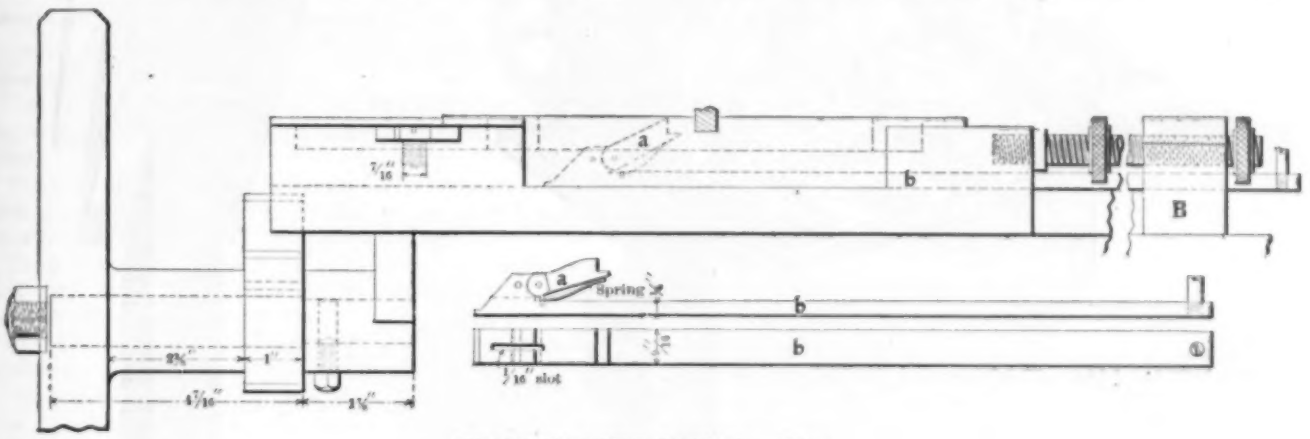
A turret adapted to be used on a lathe carriage is shown by the accompanying engravings, by which it will be seen that the turret is adapted to the use of the ordinary form tool-post, six of these being held in a T-slot which extends entirely around the turret in its upper face.

The turret is arranged to be released automatically, rotated and again locked by the action of moving the cross-slide, the movement required for this being one and a half inches. To quicken this movement a pinion replaces the ordinary crank-handle on the cross-feed screw, and a gear and hand-wheel are applied, so that one turn of the latter moves the slide one inch.

In Fig. 2 *A* is an adjustable piece by which the locking bolt is withdrawn through the medium of the lever *B*, the slot formed in the side of the locking-bolt allowing the lever to pass the trip on the forward movement of the slide.

The turret is rotated by means of six steel pins, shown in Fig. 2, one of these engaging during the backward movement with the trigger *a*, Fig. 3, which is pivoted to the rod *b* and held up by a spring which allows it to be depressed by the pins as they move over it in the opposite direction. The rod *b* is also adjustable forward and back by the means shown in Fig. 2, so that the rotation of the turret may take place at any desired point of the travel of the cross slide. The same piece (*B*) to which the rod *b* is locked by the pin as shown answers also as an adjustable stop for the cross-slide in both directions.

This turret attachment is made by Fay & Scott, of Dexter, Me., for their 16-inch and 18-inch lathes, and will be made for other sizes. It is intended to be put on in place of the ordinary tool block for work in which it can be used to advantage. The change from one to the other can be readily made, and the only thing requiring to be done to the carriage in order to apply it is to drill and tap two holes by which to attach the bracket that holds the stud for gear and hand-wheel in front. —[American Machinist.



TURRET FOR LATHE CARRIAGE.—FIG. 3.

Cervera's Fleet and the Maine Disaster.

It seems that, after all, Spain has given unwilling, but very convincing testimony as to the manner in which the battleship Maine was destroyed in Havana harbor. At the time of that catastrophe Spanish officials loudly insisted that the cause was an internal explosion of one or more magazines, the result of "carelessness and a notorious lack of discipline on the American ships." But the board of officers appointed to report upon the result of our gun fire upon the ships of Admiral Cervera, sunk in the Santiago fight, incidentally find a valuable object lesson in the appearance of these ships that has a direct bearing upon the destruction of the Maine. Three of the four Spanish warships were blown up by their own magazines, and one of them had every magazine exploded, with all its torpedoes in addition. But as compared with the wreck of the Maine, there was no upheaval of the keel and little bulging of the plates except in the immediate vicinity of the point of impact; the effect of the explosion was nearly always upward, the protective deck was sometimes lifted, but, except for the springing of a few plates, the hulls were intact. In other words, the evidence gathered from the wrecks of these Spanish warships, that in armor and guns were practically superior to the Maine, conclusively shows that the latter ship was sunk by an external explosion, however brought about.—[Engineering News.

STEEL FOR TIN PLATE.

In a recent article in a German chemical periodical experiments are referred to which were conducted for the purpose of throwing light on the composition of iron or steel best adapted to resist corrosive influence when in the form of sheets or pipe. A large number of analyses of pipes and sheets was made, in which carbon, silicon, copper, nickel, phosphorus, sulphur, and manganese were determined. Each sample was at the time experimented on to determine the facility with which it corroded. Twelve grades of iron or steel were finally selected which showed an unusually small power of resistance to corrosion. None of these was low in both phosphorus and manganese, it appearing that the higher the phosphorus and manganese, the more liable was the metal to corrode. The writer therefore recommended that where iron or steel was desired to resist water and oxygen at a high temperature, the metal should have as little phosphorus and manganese in it as possible.

The result of this series of experiments, which seems to have been conducted with that laborious thoroughness and impartiality which characterizes the work of the German investigators, furnishes ammunition for those who contend that tin plate made of Bessemer steel is more liable to rust than that made of iron, especially charcoal iron. Bessemer steel invariably contains at least some manganese, and phosphorus is present in the steel in the same amount that it was present in the iron ore. There are not more than a dozen Lake Superior ores which contain less than .03 per cent phosphorus, and some exceed .10 per cent, which means that the percentage reckoned in the steel is greater.

These are only hints which open up a vast subject for the tin plate trade. The trade has no chemistry of its own. The bridge engineer knows exactly the analysis to which he desires the steel in his bridges to conform. It is the same with the car builder, and with almost every class employing large quantities of steel for a given purpose. But in tin plate or roofing plate there is nothing of the sort, and yet steel which is good for one purpose or another is not necessarily good for making tin or terne plate. A few have notions as to analysis, but they are generally not worth much, and there is no agreement or consensus of opinion. The architect in specifying the roofing plate to be used on the building under his care often has decided views, but even then it is alleged that in many cases these views are based on his feelings toward the manufacturer of the plate, rather than to the product, and that the basis of his preference is a cause totally disconnected with the characteristics of the plate he specifies.

In the tin plate trade one of the main difficulties is that there is no authority whose personal interest it would be to make an exhaustive study of the subject. When the Pennsylvania Railroad orders car springs, for example, it has experts whose duty it is to determine exactly what kind of material is wanted. When the specifications are drawn up they are a law which the buyer imposes on the seller and, emanating from such a source, they are considered trustworthy by others who are not, perhaps, in position to make a rigid investigation themselves. In the tin plate trade we lack such authorities, whose business it is to find out these things.—"Fer Blanc," in Tin and Terne.

TRIPLE BOLT CUTTING MACHINE.

The triple bolt cutter of the Acme Machinery Co., Cleveland, is designed with a view to the production of as large a quantity of work as its possible for a single operator to handle and yet run the machines at a rate of speed insuring long life to machines and dies and securing perfect work. Compactness is a feature of the construction, every part being easily reached by the operator. Holes in the bed, directly under each head, allow the oil and chips to fall in the pan, which has a screen bottom and capacity sufficient to hold the chips of the day's work. Thus they may be left to drain over night and the pan may be drawn out and emptied in the morning. The carriages are long, affording ample bearing. The long levers shown move the carriages; the short levers close the vises and are adjustable to any angle. The movement of carriages and vises is thus quick and easy.

The heads are of an improved type, using the die with which this company's name has long been connected, with die-rings of special length, lined with tool steel blades. The total length is five inches shorter than the usual form of Acme head. The yoke which opens and closes the head is locked by a toggle between the lower end of the yoke and the head stock. The upper end of the yoke is connected with the nut that works on a screw, having a knurled head, and the dies are thus adjusted to size, without stopping the machine, by means of the knurled head screw. The toggle is controlled by a rod passing through a bracket on the carriage; this rod carries two adjustable collars which are set to open and close the head automatically. These machines are arranged so they may be run as single, double or triple bolt cutters. The weight of the one-inch machine is 3,000 pounds, the floor space occupied is four feet six inches by four feet two inches, and the speed of the countershaft is 175 revolutions a minute. The one and a half inch machine weighs 3,800 pounds, it occupies space five feet two inches by four feet 10 inches, and the countershaft makes 16 revolutions a minute.

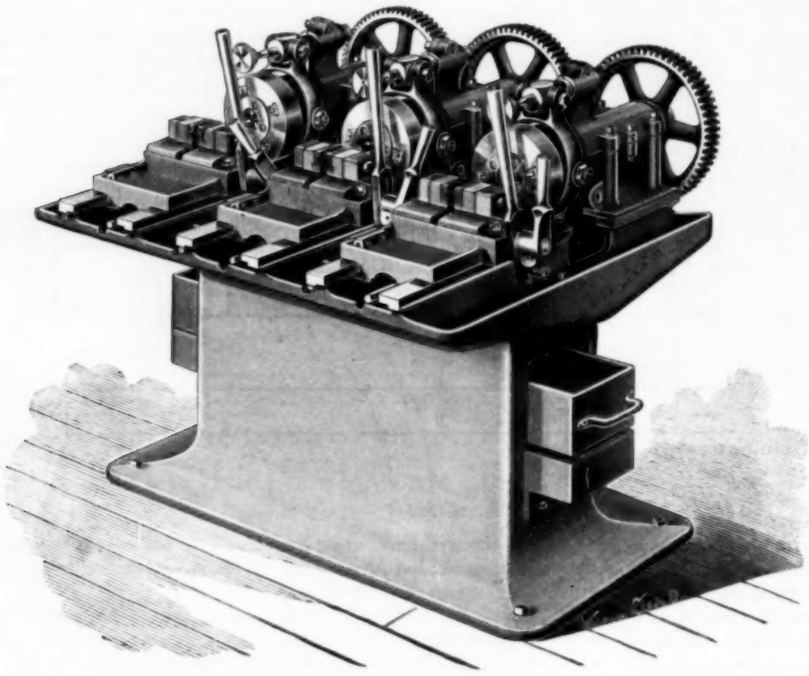


FIG. 1.—TRIPLE BOLT CUTTERS.

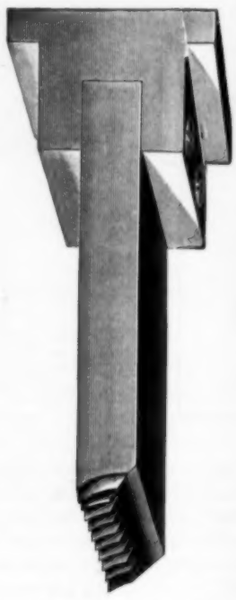


FIG. 2.—BOLT CUTTING DIE.

LONERGAN & KNOOR, proprietors of the City Foundry, Cleveland, now have 96 men on the pay-roll, and have been running over time of late. This foundry has considerable work on hand for the Acme Machinery Co., including the bends for the bolt heading machines of the latter, one recently made weighing 14 tons. Special castings for city work are also made, and architectural castings constitute a feature of the output, including columns, bases, etc., and considerable general jobbing work is done. Prices in these lines are not satisfactory, though the volume of business the past year has been quite large.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

Christiana advices says that the State of Norway has just advertised for bids for the delivery of 7,850 tons of steel rails, with joints and bolts, and also for 95 baggage cars. The bids are to be in on or before Aug. 24. The rails might well be competed for by American mills. The cars are manufactured in Norway and are of a peculiar construction. Bids may be sent to the United States Consul, Henry Bordwich, by mail or wire.

The Peerless Supply Co. has been incorporated at Camden, N. J., capital $1,000,000, with $1,000 paid in, to carry on the business of iron founders. The incorporators are Geo. Mander, Lewis B. Lee and G. H. B. Martin.

The Marshall & Huschart Machinery Co., Chicago, has been licensed to incorporate, with $50,000 capital. Incorporators. Alfred Marshall, Frank M Huschart and Benj. P. Marsh.

The Osterlein Machine Co., Cincinnati, capital stock $30.000, has been incorporated.

New Construction:—

The Janny Mfg. Co., Ottumwa, Ia., will receive bids from Aug. 15 to 20 for the erection of three two-story and seven one-story buildings, each 50x150 feet, to be used in the manufacture of farm implements. A 100-h. p. Corliss engine and a boiler will be needed, also electric power to run the entire plant.

At Macon, Ga., Stahle & Lange will put in operation the old Macon foundry and machine shops.

B. T. Johnson, Jr., Narrows, Va., will buy second-hand machinery for working sheet metal.

A factory for the manufacture of buggy gearings will be erected at Flint, Mich. The company will have a capital stock of $100,000.

W. D. Brook & Co., Homer, N. Y., are building a plant for the manufacture of steel bob-sleighs.

Work will start on Sept. 1, on the new plant of the Shiffler Bridge Co., to be located on a six-acre tract at Homestead. The new plant is to be much larger than the present works at 48th St. and Allegheny Valley Railroad. All heavy work is to be done at the Homestead works.

The Riter-Conley Co., of Pittsburg, has the contract for the construction of the new buildings for the Burgess Steel & Iron Co., Portsmouth, O. The two larger buildings will be

COCHRANE SEPARATORS

"BLUE STEAM."

Ever notice the color, or apparent color effect, of a jet of steam issuing from a pet cock in a live steam main? Was it whitish? That was due to entrained moisture. The bluish color, or perfect transparency, is present only when the steam is dry.

Dry steam (it does not matter how wet it was originally) can always be had using a COCHRANE STEAM SEPARATOR. The mission of these appliances is to take water out of steam--to insure dry steam to engines, whether the steam comes ladened with a small quantity of moisture, or whether it is carrying a "flush" or a "slug" of water.

In our new Separator catalogue, which is fully illustrated, we detail something like 105 different sizes and constructions—building Separators to suit the conditions, being one of our hobbies. Postal requests or catalogues will not be noticed.

HARRISON SAFETY BOILER WORKS,
(Columbia Station), PHILADELPHIA, PA.

ALSO MANUFACTURERS OF THE
COCHRANE HEATERS.

175x500 and 100x256 feet. The latter will be equipped with a traveling of crane 40-feet span and 50 tons capacity.

The Springfield (Mass.) Drop Forging Co. is fitting up its newly completed works and 200 men will be at work Sept. 15. The first floor, which is 200x50 feet, will be fitted up with drilling, reaming and screw machines. A new engine of 200 h. p. has been installed.

Additions, Enlargements, Removals, Etc.:—

The Baush & Harris Machine Tool Co., Brightwood, Mass., contemplates adding to its works.

The Phoenix Foundry & Mfg. Co., Lansdale, Pa., is building an addition 75x50 feet, to be occupied with a galvanizing plant.

The National Malleable Castings Co.'s Chicago plant, at 26th st. and Blue Island ave., is being increased by two brick warehouses, two stories, 60x350 and 60x150 feet.

The foundry of the New York Air Brake Co., Watertown, N. Y., is to be enlarged and other additions made. Business has been increasing considerably.

The plow works in West Toledo, O., are to be enlarged and improved.

It is stated that the Titusville Iron Co., Ltd., of Titusville, Pa., intends to build in the near future additions to its radiator works, increasing the capacity four times.

The Lodge & Shipley Machine Tool Co., Cincinnati, has purchased additional ground and will erect a steel structure 300x100 feet, in addition to the necessary boiler and engine houses, etc.

At the Seyfert rolling mill, in the Reading, Pa., district, an addition 40x60 feet will be built, and new furnace and other equipment added.

The St. Joseph (Mo.) Plow Co. will erect two new additions to the plant and install new machinery for manufacturing plows and agricultural implements.

It is stated that the Lindemann & Hoverson Co., Milwaukee, Wis., will build a new foundry for manufacturing heating apparatus.

Fires and Accidents:—

At Cnicago, the plant of the American Cutlery Co. was damaged $75,000 by fire Aug. 12.

Lightning struck the Cleveland Ship Building Co.'s plant at Lorain, O., Aug. 11, and did considerable damage to electrical equipment.

The machine shops, etc., of the Brunswick (Ga.) Foundry & Machine Mfg. Co., burned. Estimated loss, $50,000. It is stated that the plant will be rebuilt at once.

At Sherbrooke, Que., the works of the Jenckes Machine Co., the largest industry of the kind in Canada, were burned Aug. 13. The fire is supposed to have originated in the forge room of the Rand Drill Co. The estimated loss is $225,000; probably covered by insurance.

General Industrial Notes:—

The first heat was made at the Middlesborough, Ky., steel plant last week.

The Carnegie Steel Co. is making the first shipment from Baltimore on a large contract for steel rails for Bluefields, Nicaragua. It is understood that several shiploads will be sent to Bluefields.

It is stated that the Illinois Steel Co. has paid off the last of its $1,500,000 loan and that the company is now free from floating debt. It is now considered probable that if the consolidation of the Illinois Steel Co. and the Minnesota Iron Co. takes place the Elgin, Joliet & Eastern may be acquired.

Spence, Baggs & Co., Martin's Ferry, O., have put in a 35-h. p. gas engine, to operate the machinery in their foundry.

The Kilby Mfg. Co., of Cleveland, has large contracts under way for sugar machinery for Louisiana and California plants. The latter outfit, which goes to the California Beet Sugar Refining Co., is now about completed. It is stated that

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Saws

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No. 2. " 5 "
No. 4. " 8 "
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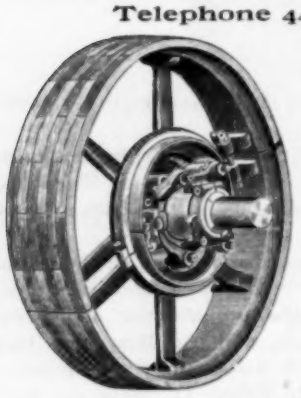

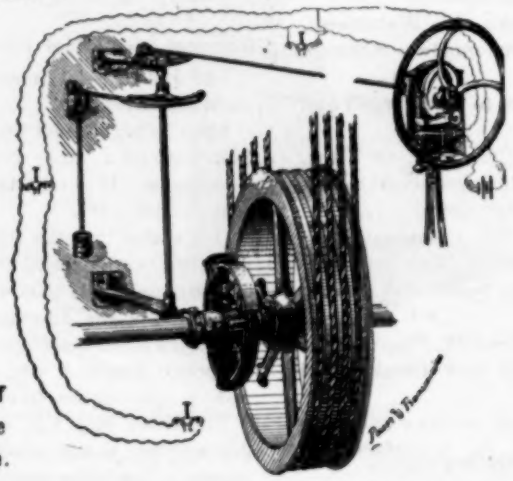

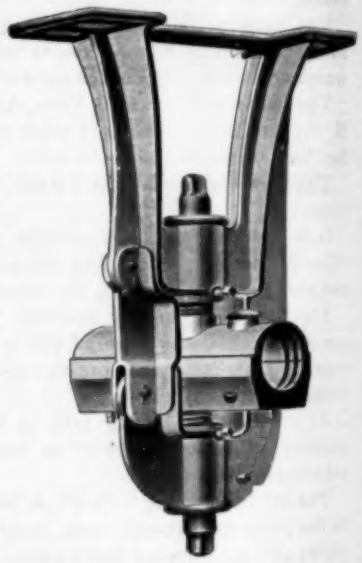

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Shafting, Hangers, Friction Clutches. Elevator, Brewery, Sugar Refinery and Oil Mill Machinery, Belting and Mill Supplies.

GENERAL AGENTS FOR THE DODGE INDEPENDENCE WOOD SPLIT PULLEYS.

some sugar refinery work for Cuba is under inquiry and that the business is likely to be closed immediately upon the signing of peace terms.

The American Steel & Wire Co.'s nail mill, at Salem, O., has been started on extra time, working 13 hours a day. The increase in working hours is caused by the strikes at Anderson and Cleveland.

The Vulcan Iron Co., of New Castle, Pa., has offered to locate in Lisbon, O., provided a site and bonus are given.

V. D. Anderson & Co., whose plant is located on the Nickel Plate Road, West Side, Cleveland, have been running 13 hours a day recently, the demand for their fertilizer and garbage dryers being a large factor. Recent shipments of dryers have been made to John Morrell & Co., packers, Ottumwa, Ia.; to Denver, Col., and to Nebraska City. The plant for the new garbage company of Cleveland was also built at the Anderson works. Two dryers have just been shipped to Australia, and shipments have been made to New Zealand and to South American countries. The foreign demand is growing. Triple-effect machines have been furnished New York City and Boston. These dryers are in use at the Armour, Swift, Morris and Hammond. The shapes, castings and tank and boiler work for the plants are done under contract by outside firms making specialties of these lines, the Anderson Co. designing, assembling the parts and doing all machine-shop work. Other specialties of the company, the manufacture of which has grown out of their being designed for the dryer, are their steam trap and their blower.

The Baldwin Locomotive Works, Philadelphia, have received contracts this year from Russia and China for over 100 locomotives for passenger, switch and freight purposes, which, together with the work being done for the big roads on this side of the water, is taxing the plant to its utmost capacity. A full force is working day and night. Forty of the locomo-

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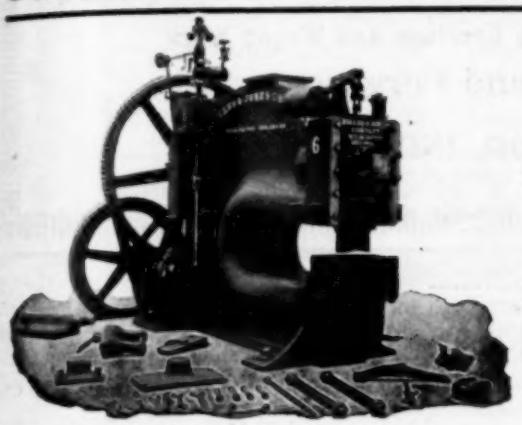
Machine Tools and Supplies. Send for list of Second-hand Tools.



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PUNCHES and SHEARS,
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IMPROVED DESIGNS FOR
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CHAS. L. BASTIAN MFG. CO.,
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OF ALL KINDS
MANUFACTURED BY
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SEMI-STEEL
PROCESS.
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HANSON McDOWELL,
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A B C OF IRON,
NOW $1.00.

SHENANGO VALLEY STEEL CO., New Castle, Pa.,
MANUFACTURERS OF
Bessemer Pig Iron, Steel Billets, Blooms, Black Plate, Tin Plate, Tin Plate Bars, Wire Rods, Market Wire and Wire Nails.

tives constructed under the Russian contract are now being loaded for shipment. The Baldwin works are busier than in two years, and other large works in Philadelphia are exceptionally busy.

The Forest City Steel & Iron Co., of Cleveland, has been crowded with work in the past two months, during which time its plant has been operated 120 hours a week, a night shift being employed. It is expected that double time will be made also for another month. Among buildings for which this company has had the iron and steel construction work are the Pitt, Ellington and Penn buildings of the Bradley estate, the DeKlyn apartment house, the Detroit Opera House and train sheds at Toledo for the Lake Shore Railroad. Among prominent structures for which the steel work was done by the Forest City company are the Chamber of Commerce Bldg., the Pythian Temple, the Kirk-Christy and the Ajax buildings, Cleveland, and the Schultz Bldg., Columbus. Contracts booked will keep them well employed for several months, and in some instances orders have been refused.

The entire plant of the Valentine Iron Co., at Bellefonte, Pa., has been advertised to be sold at sheriff sale Aug. 22. A syndicate of creditors and Baltimore capitalists is figuring on the plant.

L. S. Kingman, assignee for the Weir Plow Co., has been granted an order for the sale of the plant to the highest bidder on Sept. 15. The sale will include all the interests of the company in Monmouth and Moline, Ill.

The rolling mill removed some time ago from Roanoke, Va., to Sheffield, Ala., is about ready for operation.

The surprising announcement is made that the Old Meadow Rolling Mill, at Scottdale, Pa., now nearing completion, will not sign the wage scale, though it is said union sheet mill wages will be paid. The erection of the mill is the result of a movement by striking employes of the Scottdale Iron & Steel Co. Local capitalists subscribed sufficient to build the plant and many of the men have been waiting patiently to get employment. Their grievance against the Scottdale company was its refusal to sign the scale.

It is officially announced that the directors of the Westinghouse Electric & Mfg. Co. have authorized the issue of $3,500,000 25-year five per cent gold debenture cretificates and sold $3,000,000 of such issue without mortgage upon condition that no future lien shall be created. The proceeds of the sale are to retire the outstanding floating and bonded indebtedness of the company.

The two Uehling pig iron casting and conveying plants to be installed at the Bolckow, Vaughn & Co. furnaces in Middlesborough, Eng., will have two lines of molds, making about 700 molds to each conveyor. J. W. Miller, general manager of the Uehling interests, is now on his way to Europe on business connected with the introduction of the conveyor abroad. The plant that has been building for the Carrie Furnace, at Rankin, Pa., is now ready for operation.

The Patterson Foundry Co., of Cleveland, now located on Lake st., Cleveland, will remove, Oct. 1, to the large works formerly occupied by the Paige Car Wheel Works, and occupying an enire block. The Ajax Mfg. Co. will remove to the same works, there being ample room for the two indus-

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tries—foundry, forge shop and machine shop. The Patterson Foundry Co., manufactures castings for the Ajax Mfg. Co., these including beds for a number of heavy machines. Recent contracts of the Patterson Foundry include considerable special water works work—Ts, crosses and curves. A 48-inch cross for the Cleveland water works has been completed, and under a previous contract a 60-inch cross weighing 16½ tons was made for the Cleveland water works pumping station. The company also makes large numbers of sewer and highway castings, man-holes, etc. Another specialty is architectural work, columns, bases, etc. The castings for the American Steel & Wire Co.—mill and furnace castings, guides and wire reels—are also manufactured in its foundry.

At Pottstown, Pa., the plate mill of the Ellis & Lessig Steel & Iron Co., after an idleness of over a month, resumed operation last week, with prospects of a steady run. The mill will be run night and day and 200 hands employed. It has been repaired and remodeled during its idleness.

The New Castle (Ind.) Bridge Co. has been acquired by Eugene Runyan, formerly of the Indiana Bridge Co., Muncie, Ind., and Chas. Mouch.

Improvements have been made at the rod mill of the Oliver Wire Co., on the South Side, Pittsburg, including new reels and a carrier for taking the rods away from the reels.

Recent bids on 8-inch cast iron pipe for Renovo, Pa., were as follows: R. D. Wood & Co., $18.90 a ton; Warren Foundry & Machine Co., $19.40 a ton; Chas. Millar & Son, $20.27; National Foundry & Pipe Works, $19.39; Buffalo Cast Iron Pipe Co., $19.90; Chattanooga Foundry & Pipe Co., $18.93; Jackson & Woodin Mfg. Co., $19.25; Donaldson Iron Co., $18.94; E. K. Post, $19.54.

For the foundation for the four stoves at the Keystone Furnace, Reading, Pa., 2,300 barrels of cement were used, the excavation being 97 feet long, 27 feet wide and 41 feet deep. The stoves will be 75 feet high and the stack 83 feet. The capacity of the furnace will be between 1,500 and 1,800 tons a week.

The Riverside Iron Co.'s tack plate mill employes at Wheeling, W. Va., who were on strike for higher wages, returned to work at the old scale.

Of the 30 furnaces in Allegheny county, 28 are in blast, including two speigel furnaces. The weekly capacity of these furnaces as estimated for Aug. 1. is 56,550 tons compared with 59,113 July 1.

The floating machine shop "Vulcan" at present with Admiral Sampson's fleet, is furnished with plate bending rolls, punch and shears, etc., built by the Hilles & Jones Co., of Wilmington, Del.

The new Bellaire Stove Co. foundry, Bellaire, O., with nearly double its former capacity, is now running with a full force.

One of the Sheridan furnaces, at Lebanon, Pa., recently started under a new company, English stockholders, principally, will be obliged to bank, as the Cornwall Ore Bank Co. refuses, it is said, to recognize the ore lease under which the previous owners operated the plant.

The Terre Haute Car & Mfg. Co., Terre Haute, Ind., has a large number of contracts on hand and is running full time. About 200 more men will be put on.

No. 1 furnace of the Colebrook plant of the Lackawanna Iron & Steel Co., will be stated as soon as repairs are made. A new machine shop will be added.

The fire brick works of James V. Rose, Sharon, Pa., are running full. Contracts are on hand to supply brick for relining the Shenango Furnace, at New Castle, also for remodeling the Mabel Furnace, of Perkins & Co., at Sharpsville, Pa.

The sale of the Irondale Furnace, at Independence, W. Va., together with 1,300 acres of land and a number of dwellings, by the United States Court, is likely to be set aside, as the property, which was bid in at only $11,400 is said to be really worth $200,000.

It is reported that the Thomas Iron Co. will dismantle both of the Lock Ridge Furnaces at Alburtis, Pa. One was blown out in July.

The McKenna Steel Working Co. started its rail rerolling plant at Armourdale, Kansas City, Mo., Aug. 10. When carrying machinery is installed, it is expected that 1,500 rails a day will be turned out.

The Hill Clutch Co., of Cleveland, reports a considerably larger volume of business than in 1897 and that the war has not affected its operations, as it has had no Government work on hand. It is now working on a transmission outfit for the Ellison Electric Light Co., of Cincinnati. Other equipments of shafting, pulleys, hangers, bearings, etc., have been furnished the Diamond Portland Cement Co., Middle Branch, O.; the City of Jacksonville, Fla., for an electric lighting plant; the Montgomery Electric Light Co., Montgomery, Ala.; the Stockton Gas & Electric Light Co., Stockton, Cal.; the U. S. Electric Light Co., Washington, D. C.; the Milwaukee Electric Railway & Light Co., Milwaukee, Wis.; Kimberly & Clark, Neenah, Wis. The company makes a specialty of its patented clutches and bearings.

The Sargent Co.'s open-hearth steel plant, at Chicago, has been running for the past few months at its fullest capacity on several large contracts, including the castings for the 10-inch gun carriages for the United States Government. The Sargent Co. has readily met the physical tests prescribed by the Government, as well as the short delivery which is demanded in most cases.

LOUISVILLE, Ky., city council has passed an ordinance exempting from municipal taxation for five years any industry locating in that city. Only the State tax upon real and personal property, 52½ cents on $100, would be required during the period of exemption. The Louisville Commercial Club, the Board of Trade and the Merchants' and Manufacturers' Association, are doing much to interest manufacturers in the advantages of the city.